

DICTIONARY OF
ECOLOGY
AND THE
ENVIRONMENT

P.H. COLLIN

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PREFACE

Problems concerning the environment and man's contribution to its destruction or conservation have become more and more urgently discussed over the past years, and are the subject of both academic and general study.

This dictionary provides the user with the basic vocabulary used in studies relating to ecology and the environment. Pollution, climatology, farming practice, waste disposal and many other topics are all covered.

The terms are defined in simple English in a way which makes them accessible to the layman; examples of usage are given, in particular extracts from newspapers and magazines published both in Great Britain and the United States. More extended coverage of some topics is provided by the encyclopaedic comments. At the back of the book the reader will find a useful supplement of information in the form of tables.

We are particularly grateful to Margaret Jull Costa who read the text in proof and to Dr Roger Panaman who both read the text and contributed many scientific points. The cover design is by Peter Cartwright.

Aa

Vitamin A or **retinol** *noun* vitamin which is soluble in fat and can be formed in the body, but which is mainly found in food, such as liver, vegetables, egg yolks and cod liver oil

COMMENT: lack of Vitamin A affects the body's growth and resistance to disease and can cause night blindness

abate *verb* to become less strong

◇ **abatement** *noun* reduction or becoming less strong; **Noise Abatement Society** = association formed to try to influence people to reduce noise pollution

abiotic *adjective* not biological or not relating to living organisms

ablation *noun* removal of the top layer of something; melting of snow or ice

ABO system *noun* system of classifying blood groups

COMMENT: blood is classified in various ways. The most common classifications are by the agglutinogens in red blood corpuscles (factors A and B) and by the Rhesus factor. Blood can therefore have either factor (Group A and Group B), or both factors (Group AB) or neither (Group O), and each of these groups can be Rhesus negative or positive

abscission *noun* shedding of a leaf or fruit due to the formation of an abscission layer of cells between the leaf or fruit and the rest of the plant (it occurs in autumn, or at any time of the year in diseased parts of a plant)

absolute *adjective* (i) complete; (ii) terminal point (not compared with anything else); **absolute humidity** = vapour concentration or ratio of the mass of water vapour in a given quantity of air to the amount of air

absorb *verb* to swallow up or consume; to take something up by chemical action; **salt absorbs moisture in the air**

◇ **absorbent** *adjective* which absorbs

◇ **absorption** *noun* action of taking a liquid into a solid; **absorption plant** = part of a petroleum processing plant, where oil is extracted from natural gas

abstraction *noun* removal

QUOTE a statutory limit on water abstraction from the Thames was set in 1911, in essence to maintain the quality of water in the river and provide for navigational needs

London Environmental Bulletin

abundance *noun* large amount or number of something; **relative abundance** = number of specimens of a plant or animal seen in a certain area or over a certain time

◇ **abundant** *adjective* occurring in large numbers; **the ocean has an abundant supply of krill**

abyss *noun* (i) very deep hole; (ii) very deep part of the sea

◇ **abyssal** *adjective* referring to the deepest part of the sea; **abyssal zone** = deepest and darkest part of the sea below the euphotic zone (about 4,000 metres deep) where light cannot reach and plant and animal life is rare

◇ **abyssopelagic** *adjective* (organisms) in the deepest part of the sea, at depths greater than 3,000m

Ac *chemical symbol* for actinium

acarid *noun* mite or tick or small insect which feeds on plants or animals by piercing the outer skin and sucking juices

◇ **acaricide** or **acaridicide** *noun* poison used to kill mites and ticks

◇ **Acarida** or **Acarina** *noun* scientific name for the order of animals including mites and ticks

access *noun* right of access = (i) right of someone to be able to get to land by passing over someone else's property; (ii) right of the public to walk in areas of the countryside, providing they do not harm crops or farm animals; **access order** = court order which gives the public the right to go on private land

acclimatize *verb* (i) to make something become used to a different sort of environment, usually a change in climate; (ii) to become used to a different sort of environment; *plants take some time to become acclimatized to tropical conditions*

◇ **acclimatization** or **acclimation** *noun* action of becoming acclimatized

COMMENT: when an organism such as a plant or animal is acclimatizing, it is adapting physically to different environmental conditions, such as changes in food supply, temperature or altitude

accumulate *verb* to make or become greater in size or quantity over a period of time; *sediment and debris accumulate at the bottom of a lake*; **accumulated temperature** = temperature (the number of hours and degrees) above a certain point, usually taken in the UK to be the number of hours above 6°C, which is the minimum temperature necessary for growing crops

Acer *noun* scientific name for maples and sycamore

acid *noun* chemical compound containing hydrogen, which dissolves in water and forms hydrogen, or reacts with an alkali to form a salt and water, and turns litmus paper red; *hydrochloric acid is secreted in the stomach and forms part of the gastric juices*; **inorganic acids** = acids which are derived from minerals, such as hydrochloric acid and sulphuric acid; **organic acids** = weak acids which contain carbon, some of which are pesticides; **acid mine drainage** = water containing acids, which drains from mine workings or from heaps of mine refuse, and enters the drinking water supply; **acid mine water** = water in mine workings which contains acid from rocks; **acid-neutralizing capacity** (ANC) = ability of water (shown by the amount of bicarbonate it contains) to neutralize acids entering from runoff or acid rain

◇ **acidic** *adjective* referring to acids; *soil and vegetation in high altitude forests are directly exposed to an extremely acidic cloud base*; **acidic properties** = properties associated with acids; **acidic rocks** = rocks which contain a high proportion of silica; **acidic water** = water which contains acid

◇ **acidification** *noun* process of becoming acid or of making a substance more acid; *acidification of the soil leads to the destruction of some living organisms*

◇ **acidify** *verb* to make a substance more acid; *fallout causes acidified lakes with no fish population*

◇ **acidity** *noun* level of acid in a solution; *the alkaline solution may help to reduce acidity*

COMMENT: acidity and alkalinity are measured according to the pH scale. pH7 is neutral, pH6 and below is acid

acid rain *noun* rain (or snow) which contains a higher level of acid than normal

◇ **acid soot** *noun* acid carbon particles which fall from smoke from chimneys

COMMENT: acid rain is mainly caused by sulphur dioxide, nitrogen oxide and other pollutants which are released into the atmosphere when fossil fuels containing sulphur (such as oil or coal) are burnt. Acid rain rarely falls near the source of the pollution, because the smoke from chimneys can be carried by air currents for many kilometres before it finally falls as rain. So Scandinavia receives acid rain which is caused by pollution from British and German factories; Canada receives acid rain from factories in the US. Acid soot, on the other hand, can fall relatively close to the source of pollution. It is caused when carbon combines with sulphur trioxide from sulphur-rich fuel to form particles of an acid substance which can damage the surfaces it falls on (such as stone buildings). The effects of acid rain are primarily felt by wildlife. The water in lakes becomes very clear as fish and microscopic animal life is killed. It is believed that it is acid rain that kills trees, especially conifers, which gradually lose their leaves and die

acoustics *noun* study of sound, especially noise levels in buildings

◇ **acoustician** *noun* person (such as an architect) who specializes in the study of noise

acquired *adjective* (condition) which is neither congenital nor hereditary, and which develops in reaction to the environment; **acquired immunity** = immunity which a body acquires and which is not congenital

acre *noun* unit of measurement of land area, equal to 4,840 square yards, or 0.4047 hectares

act *verb* to take action or to have an effect on something; *the emergency services acted quickly to contain the oil spill*; *pesticides act on the animals' nervous system*

actinide *noun* one of the radioactive elements (actinium to lawrencium) which are in the same category as uranium in the periodic table, with atomic numbers from 89 to 104

◇ **actinium** *noun* natural radioactive element, produced from the decay of uranium-235
NOTE: chemical symbol is **Ac**; atomic number is 89

COMMENT: actinides are waste products from nuclear fission. They pose problems for disposal as some of them have very long half-lives. They can be reduced to more disposable forms by burning in fast reactors

action *noun* thing which is done; effect; to take action against something or to stop something = to work to prevent something happening; *the government is taking action to stop the spread of pollution*

◇ **activate** *verb* to make something start to work; **activated carbon** or **activated charcoal** = form of carbon to which gases can stick, used in gas masks or as a filter to control pollution or added to water as it is being treated before domestic consumption; **activated sludge** = sewage which contains active microorganisms and air, which is used to mix with untreated sewage to speed up the purification process

◇ **active** *adjective* working; **active margin** = area at the edge of a continental mass, where volcanic activity is frequent; **active volcano** = volcano which is erupting or likely to erupt

◇ **activity** *noun* action or movement; **volcanic activity** = earthquakes, eruptions, lava flows, etc.

acute *adjective* (i) (problem or situation) which has rapidly become very serious; (ii) (disease) which comes on rapidly and can be dangerous; *the region is suffering from an acute shortage of medical supplies; after the acute stage of the illness had passed, he felt very weak; compare CHRONIC*

adapt *verb* to change to fit a new situation; *the animals have gradually adapted to the change in climate; people adapt to the reduced amounts of oxygen available at high altitudes*

◇ **adaptation** *noun* change in an organism so that it is better able to survive or reproduce (it contributes to its fitness)

◇ **adaptive radiation** *noun* development of a species from a single ancestor in such a way that different forms evolve which fit different environmental conditions

additive *noun* chemical substance which is added, especially one which is added to food to improve its appearance or to prevent it going bad; *the orange juice contains a number of additives; allergic reactions to additives are frequently found in workers in food processing factories*

COMMENT: colour additives are added to food to improve its appearance. Some are natural organic substances like saffron, carrot juice or caramel, but other colour additives are synthetic. Other substances are added to food to prevent decay or to keep the food in the right form: these can be emulsifiers, which bind different foods together as mixtures in sauces for example, and stabilizers, which can keep a sauce semi-liquid and prevent it from separating into solids and liquids. The European Community allows certain additives to be added to food, and these are given E numbers

ADI = ACCEPTABLE DAILY INTAKE quantity of an additive which a person can safely consume each day

adiabatic *adjective* (process) where no heat leaves or enters the system; **adiabatic lapse rate** = rate of temperature change in rising air (10°C per thousand metres for dry air and 5.8° per 1,000 m for damp air)

◇ **adiabatically** *adverb* without losing or gaining heat; *the air mass rises adiabatically through the atmosphere*

COMMENT: a parcel of rising air expands, because the surrounding pressure falls. Also its temperature falls because no heat can enter or leave it. If a parcel of air descends, the opposite happens, and the air temperature rises. See also INVERSION

adipose tissue *noun* body fat or tissue where the cells contain fat which replaces the normal fibrous tissue when too much food is eaten

adjust *verb* to change to fit in with new circumstances; *plants take some time to adjust to a new climatic system*

◇ **adjustment** *noun* process of physical change in response to external environmental changes

adobe *noun* (i) fine clay from which bricks can be made; (ii) bricks made from fine mud, dried in the sun

adsorb *verb* (of a solid) to bond with a gas or vapour which touches its surface

◇ **adsorption** *noun* bonding of a solid with a gas or vapour which touches its surface

advanced gas-cooled reactor (AGR) *noun* type of nuclear reactor, in which carbon dioxide is used as the coolant and is passed into water tanks to create the steam which will drive the turbines

advection *noun* movement of air in a horizontal direction (as opposed to

convection, where the air rises): **advection fog** = fog which is formed as a warm air mass moves over cold ground

adventitious *adjective* (root) which develops from a plant's stem and not from another root

AEC *US ATOMIC ENERGY COMMISSION*

aeolian *adjective* caused by wind; **aeolian deposits** = sediments which are blown by the wind; *see also* LOESS

aerate *verb* to put air into a substance; *worms are useful because they aerate the soil*

aerial *adjective* which exists in the air; **aerial roots** = roots of certain plants, which hang in the air or cling to other plants, and take up moisture from the air

aerobic *adjective* needing oxygen for its existence

NOTE: opposite is **anaerobic**

aerosol *noun* (a) tiny particles of liquid or powder which stay suspended in the atmosphere (such as mist); **condensation aerosol** = droplets of moisture which form in warm damp air as it cools; **dispersion aerosol** = droplets of moisture which are blown into the air (as spray) (b) can of liquid with a propellant gas under pressure, which is used to spray the liquid (such as an insecticide or medicinal liquid) in the form of tiny drops

COMMENT: aerosols in the atmosphere may be formed of liquid (as in the case of mist) or solid particles (as in the case of dust storms). Aerosols in the atmosphere are the form in which pollutants such as smoke are dispersed. Commercial aerosols (that is, the metal containers) may use CFCs as propellants, but these are believed to be responsible for the destruction of ozone in the upper atmosphere, and are gradually being replaced by less destructive agents

aestivation *noun* state in some animals when they become dormant during the hot summer months (not to be confused with hibernation)

aetiology or **US etiology** *noun* (study of) the cause or origin of a disease

◇ **aetiological agent** *noun* agent which causes a disease

affect *verb* to make something change; *plant growth has been affected by the change in climate; acid rain affects all freshwater lakes in the area*

afforestation *noun* growing trees as a crop; *there is likely to be an increase in afforestation of upland areas if the scheme is introduced*

aflatoxin *noun* very toxic substance formed by a fungus *Aspergillus flavus*, which grows on seeds and nuts

afrormosia *noun* hardwood from West Africa, now becoming scarce

aftershock *noun* weaker shock which follows the main shock of an earthquake

Ag *chemical symbol* for silver

agar or **agar agar** *noun* jelly made from seaweed, used to cultivate bacterial cultures in laboratories

agent *noun* (a) person who acts for another, usually in another country; *she is the local agent for the relief organization* (b) chemical substance which makes another substance react; substance or organism which causes a disease or condition

◇ **agency** *noun* (i) force that causes something to happen; (ii) office or organization which provides help; *a famine relief agency*

aggravate *verb* to make worse; *the effects of acid rain on the soil have been aggravated by chemical runoff*

aggregate *noun* crushed stones used to make concrete or road surfaces

◇ **aggregation** *noun* dispersal of plants or animals, where the individuals remain quite close together

AGR *ADVANCED GAS-COOLED REACTOR*

agri- or **agro-** *prefix* referring to agriculture or cultivation of land

◇ **agribusiness** *noun* the business of farming and making products and equipment used by farmers

agriculture *noun* farming or growing crops

◇ **agricultural** *adjective* referring to farming; **agricultural waste** = waste matter produced on a farm such as manure from animals or excess fertilizers and pesticides which run off the fields

agrochemicals *noun* pesticides and fertilizers developed artificially for agricultural use

◇ **agroclimatology** *noun* study of climate and its effect on agriculture

◇ **agroforestry** *noun* growing farm crops and trees together as a farming unit

◇ **agronomist** *noun* person who studies crop cultivation; **pasture agronomist** = person who specializes in the study of types of grass grown in pastures

◇ **agronomy** *noun* scientific study of the cultivation of crops

COMMENT: the use of land to raise crops for eating first started about 10,000 years ago. All plants grown for food have been developed over many centuries from wild plants, which have been progressively bred to give the best yields in different types of environment. Genes from wild plants tend to be more hardy and resistant to disease, and are still kept in gene banks to strengthen new cultivated varieties

◇ **airborne** *adjective* carried by the air; *there is a high risk of airborne pollution near the factory*

◇ **airstream** *noun* flow of air in a certain direction; *a westerly airstream is flowing across the country*

COMMENT: the composition of air in the lower atmosphere is: nitrogen (78%), oxygen (21%), argon (less than 1%) and trace quantities of carbon dioxide, helium, hydrogen, krypton, neon, ozone, and xenon. Air pollution can be caused by human action such as industrial processes or smoking tobacco, but also by natural disasters such as volcanic eruptions, forest fires, etc.

AI = ARTIFICIAL INSEMINATION

aid 1 *noun* (a) help; **first aid** = temporary help given rapidly until full-scale medical treatment can be given to someone who is injured or ill; **medical aid** = treatment of someone who is ill or injured, given by a doctor; medical supplies and experts sent to a country after a disaster (b) help in the form of people, food, medicines, equipment, etc., given to a developing country; *the country spends 7% of its gross national product on aid to Third World countries* (c) machine or tool or drug which helps someone do something; *crop sprayers are useful aids in combating insect-borne disease* 2 *verb* to help or to give support to; *changing to lead-free petrol will aid the fight against air pollution*

◇ **aid agency** *noun* organization (such as Oxfam, Save The Children Fund) which specializes in sending help to countries which need it

◇ **aid** or **aid worker** *noun* person who helps; **first aider** = person who offers first aid to someone who is suddenly ill or injured

aim *verb* to intend to do something; *the government aims to bring in stricter pollution controls*

air *noun* mixture of gases (mainly oxygen and nitrogen) which cannot be seen, but which exists all around us and which is breathed by animals; *go for a walk in the mountains and get some fresh air*; *children playing in the streets are breathing polluted air*; **air frost** = condition where the temperature of the air above ground level is below freezing point; **air mass** = very large mass of air in the atmosphere in which the temperature is almost constant, divided from another mass by a front; **air pollutant** = substance (such as gas or smoke) which pollutes the air; **air pollution** = polluting of the air by gas or smoke, etc.; **air quality** = way of assessing how "good" air is, that is if it is clean, fresh, unpolluted, etc. NOTE: where referring to a distinct mass of air, the word **parcel** is used

Al chemical symbol for aluminium

Alaska *noun* US unit of measurement of the quantity of oil produced in Alaskan oilfields, needed for a certain use; *energy use in commercial buildings has fallen by almost 0.5 Alaska*; *heat conservation has eliminated fuel needs equivalent to almost 2 Alaskas*

albedo *noun* measurement of the ability of a surface to reflect light, shown as the proportion of solar energy which strikes the earth and is reflected back by a particular surface

QUOTE if cloud cover increases, the Earth's albedo can increase - clouds over the oceans contribute significantly to the overall reflectivity of the earth

Nature

COMMENT: albedo is highest on light shiny surfaces such as snow. It is lowest on dark uneven surfaces, such as masses of leaves which absorb solar energy

aldehyde *noun* one of several compound hydrocarbons, found in smog

alder *noun* fine European hardwood, which is waterproof

aldrin *noun* one of the organochlorine insecticides

aleurone *noun* protein found in the outer skin of seeds

alfalfa *noun* lucerne or plant of the Leguminosae family, grown to use as fodder

algae *plural noun* tiny plants living in water or in moist conditions, which contain chlorophyll and have no stems or roots or leaves; **blue-green algae** = Cyanophyta, algae found mainly in fresh water; **brown algae** = Phaeophyta or brown seaweed; **green algae** = Chlorophyta or green plants living in water;

red algae = Rhodophyta, type of algae found on the seabed

◇ **algacide** *noun* substance used to kill algae
 ◇ **algal** *adjective* referring to algae; *algal populations increase rapidly when phosphates are present*

COMMENT: algae grow rapidly in water which is rich in phosphates. When the phosphate level increases, as when fertilizer runoff enters the water, the algae multiply greatly to form huge floating mats (or blooms), blocking out the light and inhibiting the growth of other organisms. When the algae die, they combine with all the oxygen in the water so that other organisms suffocate

alien *noun & adjective* (species) which are not native to an area, but which have been introduced by people; *a fifth of the area of the national park is under alien conifers; alien species, introduced by settlers as domestic animals, have brought about the extinction of some endemic species*

alimentation *noun* feeding or taking in food

◇ **alimentary system** *noun* system of organs in the body (such as the throat, stomach, etc.) through which food passes and is digested

aliphatic hydrocarbons *noun* paraffins, acetylenes, and olefins, hydrocarbon compounds that do not contain benzene; *compare AROMATIC*

alkali *noun* one of many substances which neutralize acids and form salts

NOTE: British English plural is **alkalis**, but US English is **alkalies**

◇ **alkaline** *adjective* containing more alkali than acid

◇ **alkalinity** *noun* amount of alkali in something such as soil or water

COMMENT: alkalinity and acidity are measured according to the pH scale. pH7 is neutral, and pH8 and upwards is alkaline. One of the commonest alkalis is caustic soda, used to clear blocked drains

alkaloid 1 *adjective* similar to an alkali
2 *noun* one of many poisonous substances (such as atropine or morphine or quinine) found in plants which use them as defence against herbivores; they are also useful as medicines

allele *noun* one of two or more alternative forms of a gene, which can imitate each other's form (they are situated in the same area of a pair of chromosomes and produce different characteristics)

◇ **allelopathy** *noun* harm caused by one plant to another plant, usually by producing a chemical substance

allergen *noun* substance which produces hypersensitivity

◇ **allergenic** *adjective* which produces an allergy; *the allergenic properties of fungal spores*

◇ **allergy** *noun* sensitivity to certain substances such as pollen or dust, which cause a physical reaction; **food allergies** = reactions caused by sensitivity to certain foods (the commonest being strawberries, chocolate, milk, eggs, oranges)

◇ **allergic** *adjective* suffering from an allergy; *she is allergic to pollen; he showed an allergic reaction to rotting hay; allergic person* = person who has an allergy to something

COMMENT: allergens are usually proteins, and include foods, dust, animal hair, as well as pollen from flowers. Treatment of allergies depends on correctly identifying the allergen to which the patient is sensitive. This is done by patch tests, in which which drops of different allergens are placed on scratches in the skin. Food allergens discovered in this way can be avoided, but it is hard to avoid other common allergens like dust and pollen, and these have to be treated by a course of desensitizing injections

alleviate *verb* to reduce difficulties (usually only temporarily); *they are trying to alleviate the water shortage in the south of the country*

◇ **alleviation** *noun* reducing difficulties; **flood alleviation** = helping to reduce the possibility of flooding by controlling the flow of water in rivers

allo- *prefix* different

◇ **alogamy** *noun* fertilization by pollen from different flowers or from flowers of genetically different plants of the same species

COMMENT: some fruit trees are self-fertile, that is they fertilize themselves with their own pollen. Others need pollinators, usually different cultivars of the same species

allograft or homograft *noun* graft of tissue from one specimen to another of the same species

◇ **allopatriic** *adjective* (plants of the same species) which grow in different parts of the world and so do not cross-breed

alloy *noun* metal (such as brass) made from a compound of two or more metallic elements

COMMENT: many metals have practical disadvantages in the pure state, and alloys have been developed to make the best use of their advantages

alluvium *noun* silt deposited by rivers when they flood, or by lakes

◇ **alluvial** *adjective* referring to alluvium; **alluvial deposits** or **alluvial soils** = deposits of silt on the bed of a river or lake; **alluvial mining** = mining to get minerals from alluvial deposits (such as panning for gold)

alpha *noun* first letter of the Greek alphabet; **alpha particle** = nucleus of the same composition as a helium atom, which is emitted by the nuclei of some radioactive elements, such as radon, and which, when emitted, will pass through gas, but not through solids; **alpha radiation** = radiation by alpha particles from radioactive nuclei

alpine *adjective* referring to the Alps or to other high mountains; **alpine plants** = plants which grow on high mountains; **alpine vegetation** grows above the treeline

alternative *adjective* different or not following the usual way; **alternative energy** = energy produced by alternative technology (such as tidal power, wind power, etc.); **alternative medicine** = treating diseases and disorders by means which are not normally used by traditionally trained doctors (such as herbal medicines, acupuncture, etc.); **alternative technology** = using methods to produce energy which are different and less polluting than the usual ways (i.e. wind power, tidal power, solar power, as opposed to traditional or nuclear power stations)

alti- *prefix* meaning height

◇ **altimeter** *noun* instrument which records altitude

◇ **altitude** *noun* height of an object, especially above sea-level; **altitude sickness** = condition where a person suffers from oxygen deficiency at high altitudes where oxygen levels are low

◇ **altocumulus** *noun* small white cumulus clouds which form as a layer high in the atmosphere, above 3,000 metres; compare STRATOCUMULUS

◇ **altostratus** *noun* high thin uniform cloud (above 3,000 metres), usually seen as a front is approaching

aluminium or **US aluminum** *noun* metallic element, extracted from the ore bauxite

NOTE: chemical symbol is **Al**; atomic number is 13

◇ **alumina** *noun* another term for aluminium trioxide; **high alumina cement** = cement made of bauxite and limestone, used because it resists heat

Am *chemical symbol* for americium

ambient *adjective* surrounding an organism or an object; **deaths from ambient carbon monoxide poisoning are increasing**; **ambient noise** = general noise which surrounds an organism (such as traffic noise, waterfalls,

etc.); **ambient quality standards** = levels of acceptable clean air which a national body tries to enforce; **ambient temperature** = temperature of the air in which an organism lives

amelioration *noun* improvement or making better; *there has been some amelioration in pollution levels*

americium *noun* artificial radioactive element

NOTE: chemical symbol is **Am**; Atomic number is 95

amino acid *noun* chemical compound which is broken down from proteins in the digestive system and then used by the body to form its own protein; **proteins are first broken down into amino acids**; **essential amino acids** = eight amino acids which are essential for growth, but which cannot be synthesized and so must be obtained from food or medicinal substances

COMMENT: amino acids all contain carbon, hydrogen, nitrogen and oxygen, as well as other elements. Some amino acids are produced in the body itself, but others have to be absorbed from food. The eight essential amino acids are: isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan and valine

ammonia *noun* gas with a strong smell, a compound of nitrogen and hydrogen, which is a normal product of organic metabolism, and is used in compounds to make artificial fertilizers, or in liquid form as a refrigerant

NOTE: chemical symbol is **NH₃**

COMMENT: ammonia is released into the atmosphere from animal dung. It has the effect of neutralizing acid rain, but in combination with sulphur dioxide it forms ammonium sulphate which damages the green leaves of plants

amoeba *noun* single cell organism, characterized by a constant changing of its shape NOTE: plural is **amoebae**. Note also the US spelling **ameba**

◇ **amœbiasis** *noun* infection caused by amoeba, which can result in amoebic dysentery in the large intestine (intestinal amoebiasis) and can sometimes infect the lungs (pulmonary amoebiasis)

◇ **amoebic** *adjective* referring to an amoeba; **amoebic dysentery** = mainly tropical form of dysentery which is caused by *Entamoeba histolytica* which enters the body through contaminated water or unwashed food

◇ **amoebicide** *noun* substance which kills amoebae

amorphous *adjective* with no regular shape; (mineral) which does not form crystals

amount **1** *noun* quantity; *the amount of pollutants that the factory is allowed to discharge into the atmosphere is carefully controlled* **2** *verb* to be equal (to); *rainfall in some areas only amounts to a few millimetres per annum; the government's attitude amounts to a dismissal of the acid rain problem*

ampere *noun* base SI unit of electrical current, the current flowing through an impedance of one ohm which has a voltage of one volt across it

Amphibia *noun* scientific name for a class of egg-laying animals which live partly in water and partly on land (including frogs, toads, etc.), where the larvae live in water, and the adults can live both in water or on land

◇ **amphibian** **1** *adjective* (organism) which lives both in water and on land **2** *noun* animal which lives both in water and on land (such as a frog)

◇ **amphibious** *adjective* (animal) which lives both on land and in water; (vehicle) which can travel on land and on water

anabatic wind *noun* wind which blows up the slope of a mountain as it is heated by the ground

NOTE: opposite is **katabatic**

anabolism *noun* building up of simple chemicals into complex ones in an organism

anadromy *noun* form of migration of fish (such as salmon) which are hatched in fresh water, migrate to the sea and then return to fresh water to spawn

◇ **anadromous** *adjective* (species of fish) which hatches in fresh water and becomes adult in salt water; *see also* CATADROMY

anaerobic *adjective* not needing oxygen for existence; **anaerobic decomposition** = breakdown of organic material by microorganisms without the presence of oxygen

NOTE: opposite is **aerobic**

analyse *verb* (i) to examine something in detail; (ii) to separate something into its component parts; *the laboratory is analysing the soil samples; when the water sample was analysed it was found to contain traces of bacteria*

◇ **analysis** *noun* examination of a substance to find out what it is made of

NOTE: plural is **analyses**

◇ **analyst** *noun* person who examines samples of substances or tissue, to find out what they are made of

QUOTE the ozone layer is thinning in the northern as well as the southern hemisphere according to a new and exhaustive analysis of data

New Scientist

ANC = ACID-NEUTRALIZING CAPACITY

anemometer *noun* instrument for measuring wind speed

COMMENT: an anemometer is formed of four cups at the ends of the arms of a cross-piece, which is mounted horizontally on a pivot and turns round as the wind blows; it can be linked to an anemograph, which records the wind speed on a roll of paper

aneroid barometer *noun* barometer with a vacuum to which a diaphragm is attached, which moves as the atmospheric pressure changes

angledozer *noun* piece of earth-moving equipment, a bulldozer with the blade set at an angle

anion *noun* ion with a negative electric charge

annual **1** *adjective* which happens each year or once a year; **annual rings** = the rings of new wood formed each year in the trunk of a tree, and which can easily be seen when the tree is cut down; *see also* DENDROCHRONOLOGY **2** *noun* plant whose life cycle (germination, flowering, fruiting) takes place within the period of a year

COMMENT: as a tree grows, the wood formed in the spring has more open cells than that formed in later summer. The difference in texture forms the visible rings. Note that in tropical countries, trees grow all the year round and so do not form rings

anomaly *noun* something which is different; **magnetic anomaly** = way in which the local magnetic field differs from the normal magnetic field in a certain area

anopheles *noun* mosquito which carries the malaria parasite

anoxia *noun* lack of oxygen (as in tissues or water)

◇ **anoxic** *adjective* (water) which lacks oxygen

Antarctic **1** *noun* continent at the South Pole, largely covered with snow and ice **2** *adjective* referring to the Antarctic; **Antarctic air** = mass of cold air which is permanently over the Antarctic region; **the Antarctic Circle** = the parallel running round the earth at

latitude 66°33S, to the south of which lies the Antarctic region

◇ **Antarctica** *noun* area of land around the South Pole

anther *noun* part of a stamen which produces pollen

anthracite *noun* type of shiny hard black coal, which burns well and does not produce much smoke

◇ **anthracosis** *noun* disease of the lungs, caused by inhaling coal dust

anti- *prefix* meaning against;
anticondensation paint = paint which prevents the formation of condensation; **anti-pollution legislation** = laws banning pollution;
antipredator nets = nets which keep out predators

antibacterial *adjective* which destroys bacteria

antibiotic 1 *adjective* which stops the spread of bacteria 2 *noun* drug (such as penicillin) which is developed from living substances and which kills or stops the spread of microorganisms; *he was given a course of antibiotics; antibiotics are no use against viral diseases; broad spectrum antibiotics* = antibiotics which are used to control many types of bacteria

COMMENT: penicillin is one of the commonest antibiotics, together with streptomycin, tetracycline, erythromycin and many others. Although antibiotics are widely and successfully used, new forms of bacteria have developed which are resistant to them

antibody *noun* substance which is naturally present in the body and which attacks foreign substances (such as bacteria)

◇ **anticaking additive** *noun* additive added to food to prevent it becoming solid (E numbers E530 - 578)

◇ **anticline** *noun* (in rock formations) fold where the newest layers of rock are on the surface; compare **SYNCLINE**

◇ **anticyclone** *noun* area of high atmospheric pressure, usually associated with fine dry weather in summer, and fog in winter; *winds circulate round an anticyclone clockwise in the Northern Hemisphere and anticlockwise in the Southern*

◇ **anticyclonic** *adjective* (i) referring to anticyclones; (ii) referring to opposite direction to the rotation of the earth; **anticyclonic gloom** = darkness during the daytime, when low stratocumulus clouds form at the approach of an anticyclone

◇ **anticyclonically** *adverb* in the opposite direction to the rotation of the earth

◇ **antidote** *noun* substance which counteracts the effect of a poison; *there is no satisfactory antidote to cyanide*

◇ **antifouling (paint)** *noun* special pesticide painted onto the bottom of a ship to prevent organisms growing on the hull, and which may be toxic enough to pollute seawater; *see also* TBT

◇ **antifungal** *adjective* (substance) which kills or controls fungi

◇ **antihistamine (drug)** *noun* drug used to control the effects of an allergy which releases histamine

◇ **antiknock additive** *noun* substance (such as tetraethyl lead) which is added to petrol to prevent "knocking"

COMMENT: antiknock additives increase the power of petrol, but create dangerous lead pollution through exhaust fumes

antimalarial *adjective & noun* (drug) used to treat malaria

◇ **antioxidant** *noun* substance which prevents oxidation, used to prevent materials such as rubber from deteriorating; also added to processed food to prevent oil going bad (in the EC, antioxidant food additives have numbers E300 - 321)

◇ **antipodes** *noun* two points on opposite sides of the earth

◇ **antiseptic** 1 *adjective* which prevents germs spreading; *she gargled with an antiseptic mouthwash* 2 *noun* substance which prevents germs growing or spreading; *the nurse painted the wound with antiseptic*

◇ **antiserum** *noun* serum taken from an animal which has developed antibodies to bacteria, used to give temporary immunity to a disease NOTE: plural is **antisera**

◇ **antivenene or antivenom (serum)** *noun* serum which is used to counteract the poison from snake or insect bites

anvil *noun* cloud formation in a dark thundercloud, with a flat top and a point similar in shape to a blacksmith's anvil

AONB = AREA OF OUTSTANDING NATURAL BEAUTY

aphid *noun* small insect (popularly called blackfly or greenfly) which sucks sap from plants and can multiply very rapidly; *analysis of the effects on the aphid population showed a 19% increase in the rate of production*

aphotic zone *noun* water in the sea or a lake below about 1,500 m, so deep that sunlight cannot penetrate it

API = AMERICAN PETROLEUM INSTITUTE;
API scale = scale of gravity of crude oil (the heaviest oils have the lowest numbers on the scale)

aposematic *adjective* conspicuous markings on an animal which serve to discourage potential predators

apparatus *noun* equipment used (in scientific experiments or in a laboratory)

NOTE: no plural: a piece of apparatus; some new apparatus

apply *verb* (a) to ask for a job; *she applied for a job in an environmental health department* (b) to refer to; *this order applies to all producers of the pesticide; the rule applies to visitors only* (c) to put (a substance) on; *the fungicide should be applied in early spring*

◇ **application** *noun* (a) asking for a job (usually in writing); *if you are applying for the job, you must fill in an application form* (b) putting a substance on; *two applications of the pesticide should be sufficient to keep most pests off*

approach 1 *noun* way of dealing with a problem; *the government has adopted a radical approach to the problem of desertification* 2 *verb* to go or come nearer; *do not approach the deer in the breeding season; the sand dunes are approaching the forest area*

appropriate *verb* to take control of something for one's own use; *the town council has appropriated the site for a car park*

◇ **appropriate technology** *noun* technology that is suited to the local environment, usually involving skills or materials that are easily available locally; *biomethanation seems an eminently appropriate technology for use in rural areas*

COMMENT: in many parts of world, devices to help the local population cultivate the land can be made out of simple pipes or pieces of metal. Expensive tractors may not only be unsuitable for the terrain involved, but also use fuel which costs more than the crops produced

aqu- *prefix* meaning water

◇ **aquaculture** *noun* fish farming or breeding fish for food in special ponds

◇ **aquarium** *noun* container with water and a display of fish and other animals or plants that live in water; *see also* -ARIUM

◇ **aquatic** *adjective* referring to water; *aquatic animals* = animals which live in water

◇ **aquiclude** *noun* rock or soil through which water passes very slowly (such as clay)

◇ **aquifer** *noun* porous rock or soil through which water passes and in which water gathers to supply wells

Ar *chemical symbol* for argon

arable *adjective* (land) on which crops are grown; **arable farming** = growing crops (as opposed to dairy farming, cattle farming, etc.)

arachidonic acid *noun* essential fatty acid

Arachnida *noun* class of animals with eight legs (such as spiders, mites, etc.)

COMMENT: Arachnida have pincers on the first pair of legs. Their bodies are divided into two parts, and they have no antennae

arbor- *prefix* referring to trees

◇ **arboreal** *adjective* referring to trees; **arboreal animals** = animals which live in trees

◇ **arborescent** *noun* collection of trees from different parts of the world, grown for scientific study

◇ **arboriculture** *noun* study of the cultivation of trees

◇ **arborist** *noun* person who studies the cultivation of trees

arbovirus *noun* virus transmitted by blood-sucking insects

archipelago *noun* group of islands

Arctic 1 *noun* the Arctic = area of ice and snow around the North Pole, north of the Arctic Circle 2 *adjective* referring to the Arctic; **Arctic air** = mass of cold air which forms over the Arctic region and then moves south; **the Arctic Circle** = parallel running round the earth at latitude 66°32'N, north of which is the arctic region

◇ **Arctogaea** *noun* one of the main biogeographical regions, formed of the Palaearctic, Nearctic, Oriental and Ethiopian regions; *see also* NEOGAEA, NOTOGAEA

area *noun* (a) measurement of the space occupied by something; *to measure the area of the field you must multiply the length by the width; the desert covers an area of 2,500 square miles* (b) region of land; *the whole area has been contaminated by waste from the power station; Area of Outstanding Natural Beauty (AONB) = region in England and Wales which is not a National Park, but which is considered sufficiently attractive to be preserved from overdevelopment*

argon *noun* inert gas, which occurs in air and of which isotopes form in the cooling systems of reactors. It is used in electric lamp bulbs
NOTE: symbol is Ar; atomic number is 18

arid *adjective* (soil) which is very dry; (area of land) which has very little rain; **arid zone** = area in the tropics (between about 15° and 30° north and south) which is very dry and covered with deserts

◇ **aridity** *noun* state of being extremely dry

-arium *suffix* referring to a display, usually involving water; **dolphinarium** = display of dolphins; **herbarium** = display of plants in a glass container; **oceanarium** = display of animals which live in the sea

aromatic *adjective* having a pleasant smell; **aromatic compound** = compound like benzene, with a ring of carbon atoms with single and double bonds

arrester *noun* device which stops something happening; **lightning arrester** = device which prevents surges of electric current in a system, which are caused by lightning striking a building, and which can damage equipment

arroyo *noun* gully with a stream at the bottom, found in desert regions of America; *compare* WADI

arsenic *noun* chemical element which forms poisonous compounds, such as arsenic trioxide, and is used to kill rodents NOTE: symbol is **As**; atomic number is 33

◇ **arsenical** *noun* one of the group of poisonous oxides of arsenic

artesian well *noun* well bored into a confined aquifer

artefact or **artifact** *noun* man-made object; something which has arisen as a result of the process of observation or investigation

artificial *adjective* which is made by man or which does not exist naturally; **artificial community** = plant community kept by man (as in a garden); **artificial insemination (AI)** = way of breeding livestock by fertilizing females with sperm from specially selected males; **artificial rain** = rain which is made by scattering crystals of salt and other substances into clouds

As *chemical symbol for arsenic*

asbestos *noun* fibrous mineral substance, used as a shield against fire and as an insulating material in many industrial and construction processes; **asbestos cement** = mixture of asbestos and cement, used to make pipes, tiles and other small items used in construction

◇ **asbestosis** *noun* disease of the lungs caused by inhaling asbestos dust

COMMENT: asbestos was formerly widely used in cement and cladding and other types of fireproof construction materials; it is now recognised that asbestos dust can cause many lung diseases, leading in some cases to forms of cancer, with the result that constructions containing asbestos are being demolished or rebuilt with alternative materials

ascorbic acid *noun* vitamin C

COMMENT: ascorbic acid is found in fresh fruit (especially oranges and lemons) and in vegetables. Lack of Vitamin C can cause anaemia and scurvy

asepsis *noun* state of having no infection

◇ **aseptic** *adjective* referring to asepsis; *it is important that aseptic techniques should be used in microbiological experiments*; **aseptic surgery** = surgery using sterilized equipment, rather than relying on killing germs with antiseptic drugs; *compare* ANTISEPTIC

asexual *adjective* not sexual or not involving sexual intercourse; **asexual reproduction** = reproduction by taking cuttings of plants or by cloning, etc.

ash *noun* (a) European hardwood tree (b) grey or black powder formed of minerals left after an organic substance is burnt; **fly ash** = fine ash which is carried in smoke and fumes from burning processes; **volcanic ash** = ash (also small pieces of lava and rock) which is thrown up in a volcanic eruption

aspen *noun* North American hardwood

asphalt *noun* black substance formed from bitumen

COMMENT: asphalt is found naturally in tar sands, but is also manufactured as a by-product of petroleum distillation. It is used, when melted, to paint on roofs to make them waterproof or to mix with aggregate to make hard road surfaces

assimilate *verb* to take food substances which have been absorbed into the blood or into the tissues of an organism

◇ **assimilation** *noun* action of assimilating food substances (such as photosynthesis, by which plants convert light into energy and tissue)

associate *verb* to be related to or to be connected with; *the government is closely associated with the project*

◇ **association** *noun* (i) group of plants living together in a large area, forming a stable

community; (ii) group of people with similar interests

astatine *noun* natural radioactive element
NOTE: chemical symbol is **At**; atomic number is 85

aster *noun* structure shaped like a star, seen around the centrosome during cell division

asthenosphere *noun* part of the interior of the earth, formed of molten matter below the lithosphere

asulam *noun* powerful herbicide, used to remove difficult weeds such as ferns

At *chemical symbol for astatine*

atmosphere *noun* (a) gaseous zone which surrounds the earth (b) unit of measurement of pressure

◇ **atmospheric** *adjective* referring to the atmosphere; **atmospheric pressure** = normal pressure of the air on the surface of the earth; **atmospheric pressure zones** = bands of high and low pressure running round the earth (high pressure near the poles, low pressure between 40 and 70 degrees latitude north and south, high pressure along the 30 degrees latitude line in the subtropics, then low pressure again around the equator)

COMMENT: the atmosphere surrounds the earth to a depth of several thousand kilometres, but is concentrated in the 20 kilometres immediately above the planet's surface. Its pressure decreases with height. The atmosphere is divided into various layers or zones: troposphere, stratosphere, mesosphere and thermosphere. See also comment at AIR

atoll *noun* island in warm seas, shaped like a ring and made of coral

atom *noun* fundamental unit of a chemical element

◇ **atomic** *adjective* referring to atoms; **atomic energy** = energy made by fission of atoms, which, in a nuclear reactor, produces heat which warms water and forms steam which runs a turbine; **atomic fission** = splitting of atoms, which creates energy; **atomic fusion** = linking together of atoms, which creates energy; **atomic number** = number of positive electric charges round the nucleus of an atom (equal to the number of protons in the atom), giving the element its place in the periodic table; **atomic waste** = radioactive waste from nuclear reactors

◇ **Atomic Energy Authority (UKAEA)** *noun* government agency responsible for nuclear energy in the UK

◇ **Atomic Energy Commission** *noun* US agency responsible for nuclear energy in the US

COMMENT: each atom consists of protons and neutrons grouped together to form a nucleus, and electrons which surround the nucleus. Atomic energy is produced from the fission of atoms of uranium-235. One of the problems associated with the production of energy is the radioactive waste produced by nuclear reactors. This takes various forms: it can be gas (such as krypton or xenon), water from cooling processes, or spent fuel rods

atomize *verb* to reduce a liquid to very small particles

◇ **atomizer** *noun* instrument which sprays liquid in the form of very small drops like mist

attract *verb* to make something come nearer; *the solid attracts the gas to its surface*

◇ **attractant** *noun* chemical which attracts an organism; **sexual attractant** = chemical produced by an insect which attracts other insects of the same species

◇ **attraction** *noun* act or power of attracting

COMMENT: artificially produced attractants can be used to attract insects which can then be killed

Au *chemical symbol for gold*

Audubon Society *noun* society in the US, whose aims are the conservation of wildlife, especially birds

aureole *noun* glow visible round the sun, when seen through thin mist

auriferous *adjective* (deposit) which bears gold

Aurora Australis or **Aurora Borealis** *noun* illumination of the sky, which can sometimes be spectacular, caused by atmospheric disturbances associated with the sun's activity (called aurora borealis or Northern lights in the Northern Hemisphere and aurora australis or Southern Lights in the Southern Hemisphere)

Australasian Region *noun* Notogea or one of the distinct biogeographical regions into which the earth is divided, covering Australia, New Zealand and most of the islands in the Pacific Ocean

autecology *noun* study of an individual species in its environment; *compare* SYNECOLOGY

auto- *prefix* meaning self

◇ **autogamy** *noun* pollination with pollen from the same flower

◇ **autolysis** *noun* action of cells destroying themselves with their own enzymes

◇ **autonomic nervous system** *noun* nervous system formed of ganglia linked to the spinal column, which regulates the automatic functioning of the main organs of the body, such as the heart and lungs

◇ **autotroph** or **autotrophic organism** *noun* organism (such as a green plant) which takes its energy from the sun; *compare* HETEROTROPH

autumn *noun* season of the year following the summer, when days become shorter and the weather progressively colder

◇ **autumnal** *adjective* referring to the autumn; **autumnal equinox** = about September 22nd, point when the sun crosses the celestial equator and night and day are each twelve hours long

auxin *noun* plant hormone which encourages tissue growth

COMMENT: some herbicides act as synthetic auxins by upsetting the balance of the plant's growth

avalanche *noun* large mass of snow which becomes detached and falls down the side of the mountain; large mass of rock or mud which falls down a mountainside in heavy rain; **avalanche wind** = very strong wind caused by an avalanche

Aves *noun* birds, the class of egg-laying feathered animals which are adapted to fly

◇ **avicide** *noun* substance which kills birds

COMMENT: birds are closely related to reptiles, and have scales on their legs. Their forelimbs have developed into wings

azo dyes *noun* artificial colouring additives derived from coal tar, added to food to give it colour

COMMENT: many of the azo dyes (such as tartrazine) provoke allergic reactions; some are believed to be carcinogenic

Bb

B *chemical symbol for boron*

Vitamin B *noun* **Vitamin B complex** = group of vitamins which are soluble in water, including folic acid, pyridoxine, riboflavin and many others; **Vitamin B₁** or **thiamine** = vitamin found in yeast, liver, cereals and pork; **Vitamin B₂** or **riboflavin** = vitamin found in eggs, liver, green vegetables, milk and yeast; **Vitamin B₆** or **pyridoxine** = vitamin found in meat, cereals and molasses; **Vitamin B₁₂** or **cyanocobalamin** = vitamin found in liver and kidney, but not present in vegetables

COMMENT: lack of vitamins from the B complex can have different results: lack of thiamine causes beriberi; lack of riboflavin affects a child's growth, and can cause anaemia and inflammation of the tongue and mouth; lack of pyridoxine causes convulsions and vomiting in babies; lack of vitamin B₁₂ causes anaemia

Ba *chemical symbol for barium*

bacillus *noun* bacterium shaped like a rod
NOTE: plural is **bacilli**

◇ **bacillary** *adjective* referring to bacillus;
bacillary dysentery = dysentery caused by the bacillus *Shigella* in contaminated food

back *verb* (of wind) to change direction, moving in an anticlockwise direction
NOTE: the opposite is **veer**

background *noun* conditions which are always present in the environment, but are less obvious (or less important) than others; **background carboxyhaemoglobin level** = level of carboxyhaemoglobin in the blood of a person living a normal existence without exposure to particularly high levels of carbon dioxide; **background radiation** = radiation which comes from natural sources like rocks or the earth or the atmosphere and not from a single man-made source

COMMENT: background radiation can depend on the geological structure of the area. Places above granite are particularly subject to high levels of radiation. Other sources of background radiation are: cosmic rays from outer space, radiation from waste products of nuclear power plants which has escaped into the environment, radiation from TV and computer screens

backscatter 1 *noun* sending back of radiation; *backscatter contributes to an increase in albedo* 2 *verb* to send back (radiation); *a proportion of incoming solar radiation is backscattered by air in the atmosphere*

bacteria *plural noun* submicroscopic organisms, which help in the decomposition of organic matter, some of which are permanently present in the intestines of animals and can break down food tissue; many of them can cause disease; **bacteria beds** = filter beds of rough stone, forming the last stage in the treatment of sewage NOTE: the singular is **bacterium**

COMMENT: bacteria can be shaped like rods (bacilli), like balls (cocci) or have a spiral form (such as spirochaetes). Bacteria, especially bacilli and spirochaetes, can move and reproduce very rapidly

◇ **bacterial** *adjective* referring to bacteria or caused by bacteria

◇ **bacteriophage** *noun* virus which affects bacteria

badlands *noun* (in North and South America) areas of land which is (or has become) unsuitable for agriculture

bag *noun* filter made of cloth or artificial fibre, used to remove particles of matter from waste gas from industrial processes

balance *noun* state where two sides are equal; **the balance of nature** or **ecological balance** = situation where different organisms live in a stable state in the same ecosystem; **to disturb the balance of nature** = to make a change to the environment which has the effect of putting some organisms at a

disadvantage against others; **water-salt balance** = situation where the level of water in the soil balances the amount of salts

baleen *noun* series of plates like a comb, which hang down from the upper jaw of some whales and act like a sieve; **baleen whales** = Mysticeti, including blue whales, humpbacks, etc.

COMMENT: the baleen whales (which are the larger of the two groups of whales, the others being the toothed whales or Odontoceti) live on plankton and other tiny marine animals. They eat by sucking in huge quantities of water, and then forcing it out with their tongues through the baleen, which catches the plankton for the whales to eat

ballast *noun* material (such as stones) carried in the hull of a ship to make it heavier and so less likely to roll; **solid state ballast lamp** = fluorescent light bulb containing a ballast which reduces the current needed to keep the lamp bright

balsa wood *noun* very light tropical wood, used for making light-weight models

ban 1 *noun* official statement forbidding something *or* saying that something should not be done; **nuclear test ban** = ban on carrying out nuclear tests **2** *verb* to forbid *or* to say that something should not be done; **smoking is banned in most restaurants**

band *noun* (a) layer (of rock) (b) range of frequencies between two limits; **the telephone voice band is between 300 and 3400 Hz**

◇ **banded** *adjective* (rock) arranged in layers

bank 1 *noun* (a) land at the side of water, such as a river or lake (b) long heap of sand *or* snow, such as a sandbank in shallow water, either in a river or the sea, or a snowbank along the side of a road (c) place where blood *or* organs from donors can be stored until needed; *see also* BLOOD BANK, EYE BANK, GENE BANK, SPERM BANK (d) place where waste materials can be collected for recycling; *see also* BOTTLE BANK, CAN BANK **2** *verb* to cover a furnace with fine solid fuel, and so prevent it burning too fast

bar *noun* (a) long bank of sand submerged at high tide (at the entrance to a harbour) (b) unit of measurement of atmospheric pressure, divided into millibars (the atmospheric pressure at sea level is generally calculated as being 1.013 millibars)

◇ **bar-** *prefix* referring to atmospheric pressure; *see also* BAROGRAPH, BAROMETER

barium *noun* chemical element, forming poisonous compounds, used as a contrast

when taking X-ray photographs of soft tissue; **barium concrete** = concrete with barium added to it, used to absorb radiation

NOTE: symbol is **Ba**; atomic number is **56**

bark *noun* (a) hard outer layer of a tree, formed of dead tissue (b) cry of an animal of the dog family (such as a wolf *or* fox)

barley *noun* common cereal crop in temperate areas

barograph *noun* instrument which records changes in atmospheric pressure, made by attaching a pen to a barometer and recording fluctuations in pressure on a roll of paper

◇ **barometer** *noun* scientific instrument for measuring the pressure of the air, and therefore used to forecast changes in the weather; **aneroid barometer** = barometer with a vacuum to which a diaphragm is attached, which moves as the atmospheric pressure changes; **mercury barometer** = barometer made of a glass tube containing mercury, one end of the tube is sealed, the other is open, resting in a bowl of mercury; as the atmospheric pressure changes, so the column of mercury in the tube rises *or* falls

◇ **barometric** *adjective* referring to a barometer; **barometric corrections** = corrections made to the reading on a mercury thermometer, to allow for altitude and outside temperature; **barometric pressure** = atmospheric pressure indicated by a barometer

◇ **barometrically** *adverb* measured using a barometer

barrage *noun* construction to prevent *or* regulate the flow of tides, used either to prevent flooding (as in the Thames Barrage) *or* to harness tidal power

QUOTE the barrage would cost more to build than a conventional *or* nuclear plant, but it could run for a century *or* more with only minor engineering attention

Environment Now

COMMENT: the advantages of building barrages to harness tidal power are that they are economical to run and use no fuel. They do pose particular environmental problems (as do all dams) in that they may change the ecosystem of the surrounding countryside. In the case of a barrage, it would have an effect on the estuary marshlands, on the river behind the barrage, and possibly on the movement of coastal silt by the tides

barrel *noun* large round container for liquids (such as beer, wine, oil); the amount of a liquid contained in a standard barrel (42 US gallons), used as a measure of the quantity of crude oil produced

barrier *noun* wall which closes or which prevents something going through; **barrier reef** = long coral reef which lies along a shore and encloses a lagoon; **biotic barrier** = conditions which prevent the movement of members of a species to another region, so preventing the species from expanding

basal *adjective* extremely important or which affects a base; **basal area** = area of woodland actually covered by the trunks of trees; **basal metabolism** or **basal metabolic rate (BMR)** = amount of energy which a person uses in exchanging oxygen and carbon dioxide when at rest

basalt *noun* fine dark volcanic rock

◇ **basaltic** *adjective* referring to basalt; *most volcanic lava is basaltic*

base *noun* 1 (a) bottom part; *the pituitary gland hangs down from the base of the brain*; **base level** = lowest level of something, from which other levels are calculated; **base unit** = one of the seven SI units (ampere, candela, kelvin, kilogram, metre, mole, second) on which other units are based (b) main ingredient of something (such as a paint or an ointment) (c) substance which reacts with an acid to form a salt 2 *verb* to use something as a basis; *statistics, based on information gathered from several monitoring stations*

◇ **basement** *noun* lowest level of rocks, which have been covered by sediment

basic *adjective* (a) very simple or from which everything else comes; *you should know basic maths if you want to work in a shop* (b) **basic rock** = rock, such as basalt, which contains little silica; **basic slag** = waste from furnaces, which is used as a fertilizer because of its phosphate content (c) (chemical substance) which reacts with an acid to form a salt

basin *noun* large low area of land, drained by a large river system; large area of land surrounding an ocean; *thousands of tributaries drain into the Amazon basin; a ring of volcanoes around the edge of the Pacific basin*

Batesian mimicry *noun* form of mimicry where an animal mimics another animal which is poisonous, so as to avoid being eaten

bathy- *prefix* referring to the part of the seabed between 1,000 and 3,000 metres deep

◇ **bathyal** *adjective* referring to the deep part of the sea

◇ **bathylimnetic** *adjective* referring to the deepest part of a lake

battery *noun* (a) electric battery = small device for storing electric energy; *the calculator runs on batteries; a battery-powered*

car; (b) system of raising chickens, where thousands of birds are kept in small cages

COMMENT: a method of egg production which is very energy-efficient. It is criticized, however, because of the quality of the eggs, the possibility of disease and the polluting substances produced, and also on grounds of cruelty because of the stress caused to the birds. See also **FREE-RANGE EGGS**

bauxite *noun* mineral which contains aluminium ore

bay *noun* wide curved coastline, partly enclosing an area of sea

Be *chemical symbol* for beryllium

beach *noun* area of sand or small stones by the side of the sea or a lake or river

Beaufort scale *noun* scale (from 0 to 12) used to refer to the strength of wind; *the meteorological office has issued a warning of force 12 winds* NOTE: used in weather forecasts, as an indication of the force of the wind: "gales force 8, northerly"

COMMENT: the Beaufort scale was devised in the 18th century by a British admiral. The descriptions of the winds, and their speeds in knots are: 0: calm (0 knots); 1: light air (2 knots); 2: light breeze (5 knots); 3: gentle breeze (9 knots); 4: moderate breeze (13 knots); 5: fresh breeze (19 knots); 6: strong breeze (24 knots); 7: near gale (30 knots); 8: gale (37 knots); 9: strong gale (44 knots); 10: storm (52 knots); 11: violent storm (60 knots); 12: hurricane (above 60 knots)

becquerel *noun* SI unit of measurement of radiation: 1 becquerel is the amount of radioactivity in a substance where one nucleus decays per second

NOTE: now used in place of the **curie**. See also **rad**. becquerel is written **Bq** with figures: **200Bq**

bed *noun* (a) bottom of a river or lake or the sea; *a fish which feeds on the seabed; the river bed is choked with weeds* (b) layer of sediment in rock; *the cliffs show clearly several beds of sandstone*

◇ **bedrock** *noun* rock which is found under a layer of ore or coal

◇ **bedding** *noun* different layers of sediment

beech *noun* common temperate hardwood tree

behaviour *noun* way in which a living organism responds to a stimulus

◇ **behavioural** *adjective* referring to behaviour; **behavioural scientist** = person who specializes in the study of behaviour

benthos *noun* bottom of the sea or a lake

◇ **benthon** or **benthic organism** *noun* organism living on the bottom of the sea or of a lake

benzene *noun* simple aromatic hydrocarbon, produced from coal tar, and very carcinogenic

◇ **benzpyrene** *noun* ir-flammable carcinogenic substance found in coal tar, produced in the exhaust fumes from petrol engines, from coal- and oil-burning appliances, and from smoking tobacco

beriberi *noun* disease of the nervous system caused by lack of vitamin B₁

COMMENT: beriberi is prevalent in tropical countries where the diet is mainly white rice which is deficient in thiamine

berry *noun* small fleshy seed-bearing fruit of a bush

beryllium *noun* chemical element, a metal used in making various alloys NOTE: chemical symbol is **Be**; atomic number is 4

◇ **berylliosis** *noun* poisoning caused by breathing in particles of beryllium oxide

Bessemer process *noun* method of making steel

COMMENT: the process involves heating molten metal and blowing air into it at the same time; this is done in a type of furnace called a Bessemer converter. The process is used to remove phosphorus and carbon from pig iron. The air forms iron oxide, which removes impurities from the molten metal, including carbon monoxide which burns off. Finally manganese is added to the metal to remove the iron oxide

beta *noun* second letter of the Greek alphabet; **beta decay** = process of disintegration of a radioactive substance during which electrons are emitted; **beta particle** = electron which will pass through thin substances such as metal, and can harm living tissue; **beta radiation** = radiation formed of beta particles

Bhopal *noun* town in India, scene of an accident in 1984, where lethal methyl isocyanate gas escaped from a chemical plant and caused many casualties

BHT = BUTYLATED HYDROXYTOLUENE

bicarbonate *noun* main buffering substance in water

biennial 1 *adjective* happening every two years; (plant) which takes two years to complete its life cycle 2 *noun* plant which completes its life cycle (germination, flowering, fruiting) over a period of two years

Bilharzia or **Schistosoma** *noun* fluke which enters the patient's bloodstream and causes bilharziasis

◇ **bilharziasis** or **schistosomiasis** *noun* tropical disease caused by flukes in the intestine or bladder NOTE: although strictly speaking, **Bilharzia** is the name of the fluke, it is also generally used for the name of the disease: **bilharzia patients; six cases of bilharzia**

COMMENT: the larvae of the fluke enter the skin through the feet and lodge in the walls of the intestine or bladder. They are passed out of the body in stools or urine and return to water, where they lodge and develop in water snails before going back into humans. Patients suffer from fever and anaemia

binomial classification *noun* way of naming living organisms, devised by Linnaeus, using two Latin names

COMMENT: the first name is the name of the genus or generic name, and the second or specific name is the name of the species; so the species man is *Homo sapiens*, the house sparrow is *Passer domesticus*, and the redwood is *Sequoia sempervirens*. A third name can be added to give a subspecies

bio- *prefix* referring to living organisms

◇ **bioaeration** *noun* treatment of sewage by pumping it with activated sludge

◇ **bioassay** *noun* test of a substance by examining the effect it has on living organisms

◇ **biochemical** *adjective* referring to biochemistry; **biochemical oxygen demand (BOD)** = amount of pollution in water, shown as the amount of oxygen which will be needed to oxidize the polluting substances

COMMENT: diluted sewage passed into rivers contains dissolved oxygen which is absorbed by bacteria as they oxidize the pollutants in the sewage. The oxygen is replaced by oxygen from the air. Diluted sewage should not absorb more than 20ppm of dissolved oxygen

biochemist *noun* scientist who specializes in biochemistry

◇ **biochemistry** *noun* chemistry of living tissues

◇ **biocide** *noun* substance which kills living organisms; *biocides used in agriculture run off into lakes and rivers*

◇ **bioclimatology** *noun* study of the effect which the climate has on living organisms

◇ **biocoenosis** *noun* way in which animals and plants exist together in a certain feeding area

◇ **biocontrol** *noun* = BIOLOGICAL CONTROL

biodegradable *adjective* (substance) which can be easily decomposed by organisms; *organochlorines are not biodegradable and enter the food chain easily*

◇ **biodegradation** *noun* breaking down of a substance by bacteria (as in the case of activated sludge)

QUOTE human sewage is a totally biodegradable product, and sea and sunlight will break it down through the natural process of oxidation

Environment Now

COMMENT: manufacturers are trying to produce more biodegradable products, as the effect of non-biodegradable substances (such as detergents) on the environment can be serious

biodetergent *noun* biological detergent or detergent with added enzymes which make the washing process more effective

bioengineering *noun* use of biochemical processes on an industrial scale to produce drugs and foodstuff, to recycle waste, etc.

biofuel *noun* fuel from organic domestic waste and other sources which does not use up fossil fuels; *coppiced wood can be grown as biofuel*

◇ **biogas** *noun* gas (partly methane and partly carbon dioxide) which is produced from fermenting waste, such as animal refuse; *farm biogas systems may be uneconomic unless there is a constant demand for heat; the use of biogas systems in rural areas of developing countries is increasing*

◇ **biogeographer** *noun* scientist who studies regions with distinct fauna and flora

◇ **biogeographical region** *noun* large region of the earth with distinct fauna and flora

◇ **biogeosphere** *noun* top layer of the lithosphere, or the earth's crust, which contains living organisms

◇ **bioinsecticide** *noun* insecticide developed from natural toxins

biology *noun* study of living organisms

◇ **biological** *adjective* referring to biology; **biological clock** or **circadian rhythm** = rhythm of physiological functions (eating or defecating or sleeping, etc.) which is repeated every twenty-four hours; **biological detergent** =

detergent with added enzymes which make the washing process more effective; **biological indicator** = organism which is used to show changes in the environment; **biological magnification** = way in which a pollutant increases in concentration at each level of the food chain; **biological monitoring** = checking the changes which take place in a habitat; **biological oxygen demand** = amount of pollution in water, shown as the amount of oxygen which will be needed to oxidize the polluting substances

◇ **biological control** or **biocontrol** *noun* control of pests by using predators to eat them

◇ **biologist** *noun* scientist who specializes in biology

COMMENT: biological control of insects involves using bacteria, viruses, parasites and predators to destroy the insects. Plants can be controlled by herbivorous animals such as cattle

biomass *noun* (a) all living organisms in a given area or at a given trophic level (usually expressed in terms of living or dry weight) (b) organic matter used to produce energy

COMMENT: the use of biofuels for domestic heating may be a way of disposing of refuse, but it carries the risk of adding to air pollution, since the biomass itself may pollute

biome *noun* large ecological region characterized by similar vegetation and climate (such as the deserts, the tundra, etc.) and all the living organisms in it

COMMENT: the ten principal biomes are: mountain and polar regions, tropical rainforest, grasslands, deserts, temperate forests, monsoon forests, deciduous forests, coniferous forests and evergreen shrub forests

biometeorology *noun* scientific study of the weather and its effect on organisms

biomethanation *noun* system of producing biogas for use as fuel or light

QUOTE biomethanation is attractive for use in rural areas for several reasons: it is an anaerobic digestion process, which is the simplest, safest way that has been found for treating human excreta and animal manure

Appropriate Technology

bion *noun* single living organism in an ecosystem

biopesticide *noun* pesticide made from biological sources, that is from toxins which occur naturally

COMMENT: biopesticides have the advantage that they do not harm the environment as they are easily inactivated and broken down by sunlight. This is, however, a practical disadvantage for the farmer who uses them, since they may not be as efficient in controlling pests as artificial chemical pesticides (which are persistent and difficult to control)

biophyte *noun* plant (such as a sundew) which obtains nutrients from the decomposing bodies of insects which it traps and kills

◇ **biosphere** *noun* part of the earth and its atmosphere where living organisms exist (including parts of the lithosphere, the hydrosphere and the atmosphere)

◇ **biosynthesis** *noun* production of chemical compounds by a living organism

◇ **biota** *noun* flora and fauna of a region

◇ **biotechnology** *noun* use of technology to manipulate and combine different genetic materials to produce living organisms with particular characteristics; *a biotechnology company is developing a range of new pesticides based on naturally occurring toxins; artificial insemination of cattle was one of the first examples of biotechnology*

◇ **biotic** *adjective* referring to living organisms (as opposed to the chemical constituents of an environment); **biotic barrier** = conditions which prevent members of a species moving to other regions, and so prevent the species from expanding; **biotic climax** = stable biotic community; **biotic community** = community of organisms in a certain area; **biotic factors** = different organisms in an area, and the way in which they affect the plants in the area; **biotic index** = scale for showing the quality of an environment (e.g. how clean a river is) by indicating the types of organisms present in it; **biotic pyramid** = ecological pyramid or chart showing the relationships between organisms at different trophic levels (the wide mass of producers provide food for a smaller number of primary consumers, which in turn provide food for a very small number of secondary consumers); **biotic succession** = changes which take place in a group of organisms under the influence of their changing environment

◇ **biotope** *noun* small area with uniform biological conditions (climate, soil, altitude, etc.)

◇ **biotype** *noun* group of similar individuals within a species

birch *noun* common hardwood tree found in northern temperate zones

bird *noun* animal which lays eggs, and has wings; **flightless bird** = bird (such as the penguin or ostrich) which has wings, but cannot fly; **bird of prey** = bird which kills and

eats animals; **bird song** = singing calls made by birds, to communicate with each other

◇ **birdwatcher** *noun* ornithologist or person who studies birds and watches them to take notes of their behaviour

COMMENT: all birds are members of the class Aves. They have feathers, and the forelimbs have developed into wings, though not all birds are now able to fly. Birds are closely related to reptiles, and have scales on their legs

birth *noun* being born; **birth rate** = number of births per annum, shown per thousand of the population

bitumen *noun* solid hydrocarbon, contained in coal

◇ **bituminous coal** *noun* coal containing a high percentage of tar, which is harder than lignite but not as hard as anthracite, and which gives off smoke

black *adjective* with no colour or with the very darkest colour; **thick black smoke poured out of the factory chimneys**; **black bean** = type of very hard tropical wood, resistant to termites; **Black Death** = violent form of bubonic plague, a pandemic during the Middle Ages; **black earth** = chernozem or dark fertile soil, rich in organic matter, found on the plains of Russia and North and South America; **black frost** = condition when the air is dry and the ground temperature is lower than the air temperature, but no white frost forms; **black ice** = ice which is clear, not white and opaque as frost, which forms on the surface of roads at night; **black spot** = fungus which attacks plants, causing black spots to appear on the leaves

◇ **blackwood** *noun* Australian hardwood tree

blade *noun* thin flat leaf (such as a leaf of grass)

blanket 1 *noun* thick covering; *a blanket of snow covered the fields; the town was covered in a blanket of smog*; **blanket bog** = bog covering a wide area **2 verb** to cover; *thick fog blanketed the airport*

blast furnace *noun* heating device for producing iron or copper from ore

COMMENT: ore, coke and limestone are heated together, air is blown through the mixture, and the molten metal is drawn off into moulds

blaze 1 *noun* mark put on a tree to show that it needs to be felled or to indicate a path through a forest **2 verb** to blaze a trail = to show where a path goes by making marks on trees or rocks

blight 1 *noun* fungus disease of plants; they are taking steps to eradicate the epidemic of potato blight NOTE: no plural 2 *verb* to ruin or to spoil the environment; the landscape was blighted by open-cast mining

blizzard *noun* heavy snowstorm with wind; lying snow which is blown by strong wind; there were blizzards on the highlands during the weekend

blood *noun* red liquid in an animal's body; **blood bank** = section of a hospital where blood given by donors is stored for use in transfusions; **blood cell** or **blood corpuscle** = cell (red blood cell or white blood cell) which is one of the components of blood; **blood chemistry** = substances which make up blood, which can be analysed in blood tests, the results of which are useful in diagnosing disease; **blood count** = test to count the number of different blood cells in a certain quantity of blood; **blood plasma** = watery liquid which forms the greatest part of blood; **blood platelet** = small blood cell which releases thromboplastin and which multiplies rapidly after an injury; **blood serum** = watery liquid which separates from coagulated blood; **blood sugar level** = amount of glucose in the blood; **blood test** = laboratory test to find the chemical composition of a patient's blood

◇ **bloodstream** *noun* blood as it passes round the body

COMMENT: blood is formed of red and white corpuscles, platelets and plasma. It circulates round the body, going from the heart and lungs along arteries and returns to the heart through the veins. As it moves round the body it takes oxygen to the tissues and removes waste material from them. Waste material is removed from the blood by the kidneys or exhaled through the lungs. It also carries hormones produced by glands to the various organs which need them

◇ **blood group** *noun* one of the different types of blood by which groups of people are identified

COMMENT: blood is classified in various ways. The most common classifications are by the agglutinogens in red blood corpuscles (factors A and B) and by the Rhesus factor. Blood can therefore have either factor (Group A and Group B), or both factors (Group AB) or neither (Group O), and each of these groups can be Rhesus negative or positive

bloom 1 *noun* (a) flower; the blooms on the orchids have been ruined by frost (b) algal bloom = mass of algae which develop rapidly in a lake, due to eutrophication 2 *verb* to flower; the plant blooms at night; some cacti only bloom once every seven years

blow 1 *noun* sudden movement of air or gas; the blow of air through a Bessemer converter 2 *verb* (a) (of wind) to be moving; it was blowing hard on the top of the mountain (b) to move something (by the wind); topsoil was blown away by the strong winds

◇ **blow-by** *noun* unburnt fuel mixed with air and other gases produced by an internal combustion engine which escapes past the piston rings

COMMENT: in many parts of the world emission of gases from pistons is controlled by law, since these gases contribute significantly to atmospheric pollution

blowhole *noun* (a) hole in the roof of a cave by the sea, leading to the surface of the cliff above, through which air and water are sent out by the pressure of the waves breaking beneath (b) nostril of a whale, situated towards the back of the skull, through which the whale spouts air and water

◇ **blowout** *noun* sudden rush of oil or gas from an oilwell

blubber *noun* thick layer of fat under the skin of marine animals such as whales

COMMENT: fat-soluble pollutants like PCBs tend to collect in the blubber of seals and other marine animals

blue *adjective & noun* colour such as that of a clear unclouded sky in the daytime; see COMMENT at SKY; **blue whale** = large whale with no teeth, which feeds by straining large amounts of water through its baleen and so retaining plankton and other food

BMR = BASAL METABOLIC RATE

BNFL = BRITISH NUCLEAR FUELS LTD company which makes fuel rods for nuclear power stations and reprocesses spent fuel

BOD = BIOCHEMICAL OXYGEN DEMAND

bog *noun* soft wet land, usually with moss growing on it, which does not decompose, but forms a thick layer of acid peat; bog mosses live on nutrients which fall in rain; blanket bog = wide area of bog

◇ **boggy** *adjective* soft and wet (soil)

◇ **bogland** *noun* area of bog

boil *verb* to bring a liquid to the temperature at which it changes into gas; water is boiled to form steam; tourists are advised that ordinary tap water should be boiled before drinking it; **boiling point** = temperature at which a liquid changes into gas; the boiling point of water is 100°C; **boiling water reactor (BWR)** = nuclear reactor fuelled by uranium, in which light

water is heated to form steam which drives the turbines

◇ **boiler** *noun* container in which water is boiled to make steam to drive turbines, etc.

bole *noun* base of a tree trunk

bomb *noun* large piece of molten lava ejected from an erupting volcano

bond 1 *noun* close link between two substances or two atoms; **chemical bond** = force which links atoms to form molecules 2 *verb* (of two substances) to link together; **adsorption is the bonding of a gas to a solid surface**

bone *noun* (a) one of the calcified pieces of connective tissue which make a skeleton; **there are several small bones in the human ear; fossil bones are often found in limestone deposits** (b) hard substance which forms a bone; **bone conduction** = conduction of sound through bone (as opposed to air conduction); **bone structure** = (i) system of jointed bones as it forms a body; (ii) the arrangement of the various components of a bone

COMMENT: bones are formed of a hard outer layer (compact bone) which is made up of a series of layers of tissue and a softer inner part which contains bone marrow

◇ **bonemeal** *noun* fertilizer made of ground bones or horns, reduced to a fine powder

boom *noun* loud noise; **sonic boom** or **supersonic boom** = loud noise made by the shock waves from an aircraft as it travels faster than the speed of sound

Bordeaux mixture *noun* mixture of copper sulphate, lime and water, used to spray on plants to prevent attacks by blight

bore 1 *noun* (a) tidal wave which rushes up the estuary of a river at high tide (b) measurement across the inside of a pipe or hole; **the central heating uses small-bore copper piping; the well has a 2-metre bore** 2 *verb* to make a round hole (in the ground); **they have bored six test holes to try to find water**

◇ **borehole** *noun* hole bored in the ground; **the borehole is intended to test the geology of the site to see if it is suitable for burying nuclear waste; boreholes supply water of excellent quality**

boreal *adjective* referring to the north; (climate in the Northern Hemisphere between 60° and 40°N) with short hot summers and longer cold winters

◇ **borealis** *see* AURORA

-**borne** *suffix* meaning "carried by"; **airborne pollutants** = pollutants which are carried in

the air; **waterborne diseases** = diseases which are spread by animals living in water

boron *noun* element from which control rods in reactors are made

NOTE: chemical symbol is **B**; atomic number is 5

botany *noun* scientific study of plants

◇ **botanical** *adjective* referring to botany; **botanical insecticide** = insecticide made from a substance extracted from plants (the best-known botanical insecticides are pyrethrum, derived from the chrysanthemum, and nicotine, derived from the tobacco plant); **botanical specimens** = specimens of plants gathered for study

◇ **botanist** *noun* scientist who studies plants

bottle bank *noun* large container into which people put old bottles which can then be recycled into new glass

COMMENT: because recycled glass does not require extremely high temperatures to melt, it is more energy-efficient than using the usual raw materials. Also one tonne of cullet (broken glass) will produce the same amount of finished glass as ten tonnes of raw materials (mainly sand, limestone and sodium carbonate)

bottled gas *noun* gas (liquefied petroleum gas) produced from refining crude oil, and sold in pressurized metal containers for use as fuel for domestic heating, camp stoves, etc.

botulism *noun* type of food poisoning, caused by a toxin of *Clostridium botulinum* in badly canned or preserved food

COMMENT: the symptoms include paralysis of the muscles, vomiting and hallucinations. Botulism is often fatal

boulder *noun* large rounded piece of rock; **boulder clay** = clay soil mixed with rocks of different sizes, found in glacial deposits

Bovidae *noun* largest class of even-toed ungulates, including oxen, antelopes, gazelles, sheep and goats

◇ **bovine** *adjective* referring to cattle; **bovine somatotropin (BST)** = hormone used to increase milk yields in cows

bq *abbreviation* for becquerel

Br *chemical symbol* for bromine

bracken *noun* fern which grows widely on acid soils

15508

COMMENT: bracken is hard to eradicate as it sprouts easily after being burnt. The spores of bracken contain a carcinogenic substance

brackish *adjective* (water) which contains salt (though not as much as sea water) and is not good to drink

bract *noun* small green leaf at the base of a flower

bran *noun* outside covering of the wheat seed, removed to make white flour, but an important source of roughage, hence used in muesli and other breakfast cereals

breakthrough *noun* situation where sewage or other pollutants get into the mains domestic water supply

breakwater *noun* strong wall or fence which is built from the shore into the sea to block the force of waves and so protect the coast

breccia *noun* type of rough rock made of sharp fragments of other rocks fused together

breed 1 *noun* organisms of a certain species, which have been developed by people over a period of time to stress certain characteristics; **a hardy breed of sheep**; **two new breeds of rice have been developed** 2 *verb* (a) (of organisms) to produce young; **rabbits breed very rapidly** (b) to encourage to develop; **insanitary conditions help to breed disease** (c) to raise a certain type of animal or plant, by crossing one variety with another to produce a new variety where the desired characteristics are strongest; **farmers have bred new hardy forms of sheep**

QUOTE the large birds bred in the poorly drained wetlands of central Illinois

Birds of the World

breeder *noun* (a) person who breeds new forms of animals or plants; **a cat breeder**; **a rose breeder** (b) **fast breeder reactor** = nuclear reactor which produces more fissile material than it uses, making plutonium-239 from uranium-238, and so increasing the reactor's efficiency

COMMENT: uranium-238 is a natural uranium isotope and is fertile, i.e. it can be used to produce the fissile plutonium-239. In a breeder reactor, uranium-238 is used as a blanket round the plutonium fuel and when the plutonium is fissioned high-speed neutrons are produced which change on contact with the uranium-238 and eventually produce a slightly greater quantity of plutonium-239 than that originally used as fuel. The excess plutonium can be used as a fuel in another breeder reactor or in an ordinary burner reactor

breeze *noun* (a) gentle wind; **land breeze** = breeze which blows from the land towards the sea; **sea breeze** = breeze which blows from the sea towards the land; **a stiff breeze** = quite a strong wind; *see also* BEAUFORT SCALE (b) solid waste from a furnace; **breeze blocks** = large building bricks made from breeze and cement

◇ **breezy** *adjective* fresh and windy (weather)

British thermal unit (Btu or BTU) *noun* unit of measurement of heat, the amount of heat needed to heat one pound of water one degree Fahrenheit

COMMENT: a non-metric unit, used in the US rather more than in the UK

broad *adjective* wide; **broad paths are left through the forest plantations to act as firebreaks**; **broad spectrum antibiotics** = antibiotics which are used to control many types of bacteria

◇ **broadleaf or broad-leaved trees** *noun* deciduous trees (such as beech, oak, etc.) which have wide leaves, as opposed to the needles on conifers; **broadleaved evergreens** = evergreen trees with large leaves, such as rhododendrons, tulip trees, etc.; **the plan is to plant 12,000 hectares of agricultural land a year, one third of which will be broadleaves**

bromine *noun* chemical element used in various industrial processes, including antiknock additives to petrol

NOTE: the chemical symbol is **Br**; atomic number 35

bronch- *prefix* referring to the windpipe

◇ **bronchi** *plural noun* air passages leading from the trachea into the lungs **NOTE:** singular is **bronchus**

◇ **bronchial** *adjective* referring to the bronchi; **bronchial asthma** = type of asthma mainly caused by an allergen or exertion; **bronchial pneumonia** = inflammation of the bronchioles which may lead to general infection of the lungs; **bronchial tubes** = bronchi or air tubes leading from the windpipe into the lungs

◇ **bronchiole** *noun* tiny air passage at the end of a bronchus

◇ **bronchitis** *noun* inflammation of the mucous membrane of the bronchi; *acute bronchitis* = attack of bronchitis caused by a virus or exposure to cold and wet; *chronic bronchitis* = long-lasting form of bronchial inflammation

◇ **bronchus** *noun* air passage from the trachea to the lungs (it branches out into many bronchioles)

NOTE: plural is **bronchi**

brood *noun* group of offspring produced at the same time, especially group of young birds; *the territory provides enough food for two adults and a brood of six or eight young*

brook *noun* little stream

brown *adjective* of a colour like the colour of earth or wood; **brown bread** = bread made with flour which has not been refined; *brown bread is better for you than white*; **brown coal** = lignite = type of soft coal, which is not as efficient a fuel as anthracite and produces smoke when it burns; **brown earth** = **brown forest soil** = good fertile soil, slightly acid, containing humus; **brown fat** = animal fat which can easily be converted to energy, and is believed to offset the effects of ordinary white fat; **brown podzolic soil** = brown earth from which humus particles have been leached by rains

Brucella *noun* type of rod-shaped bacterium

◇ **brucellosis** *noun* disease which can be caught from cattle or goats or from drinking infected milk, spread by a species of the bacterium *Brucella*

COMMENT: symptoms include: tiredness, arthritis, headache, sweating, irritability and swelling of the spleen

BST = BOVINE SOMATOTROPIN

Btu or **BTU** = BRITISH THERMAL UNIT

bubonic plague *noun* fatal disease caused by bacteria transmitted to humans by fleas from rats

COMMENT: bubonic plague was the Black Death of the Middle Ages. Symptoms are fever, delirium, vomiting and swellings of the lymph nodes

bud *noun* young shoot on a plant, which will later become a leaf or flower

◇ **budding** *noun* way of propagating plants, where a bud from one plant is grafted onto another plant (used, for example, to propagate roses)

budget *see* ENERGY BUDGET

buffalo *noun* (a) common domestic animal in tropical countries, used for milk and also as a draught animal (b) US type of large wild cattle

buffer 1 *noun* (i) substance that keeps a constant balance between acid and alkali; (ii) solution where the pH is not changed by adding acid or alkali 2 *verb* to prevent a solution from becoming acid; *if a lake is well buffered, it will not have a low pH factor, even if acid rain falls into it; bicarbonate is the main buffering factor in fresh water*

bug *noun* informal common name for any little insect; name of certain winged insects belonging to the class of animals called hemiptera

build *verb* to make a construction; *the developer is planning to build 2,500 new houses on the greenfield site; the female birds build nests of straw in holes in trees; the built environment* = built-up areas in which people live

◇ **build up** *verb* to form by accumulation; *the traces of pesticide gradually built up in the food chain*

◇ **build-up** *noun* gradual accumulation; *a build-up of DDT in the food chain*

◇ **built-up area** *noun* area which is full of houses, shops, offices and other buildings, with very little open space

bulb *noun* fleshy stem like an onion, formed of layers of tissue, which can be planted and which will produce flowers and seed

bulldozer *noun* piece of earth-moving equipment, like a tractor with a blade in front, used for pushing soil or rocks and for levelling surfaces

bund *noun* soil wall built across a slope to retain water or to hold waste in a sloping landfill site

QUOTE farmers have traditionally relied on a system of bunding to grow sorghum in the area's semi-arid soil

New Scientist

bureaucracy *noun* (often used as criticism) (a) group of civil servants or officials of central or local government (b) slow and complicated way of working; *the distribution of aid is held up by bureaucracy; the group has complained about the bureaucracy involved in getting planning permission*

◇ **bureaucratic** *adjective* referring to bureaucracy; *relief workers are continually fighting against bureaucratic muddle*

burial *noun* action of burying something in the ground; **burial site** = place where nuclear waste is buried; *the group is opposed to the burial of nuclear waste on the site*

burn 1 *noun* (a) (in Scotland) small stream (b) injury to skin and tissue caused by light or heat or radiation or electricity or chemicals **2** *verb* to destroy by fire; *several hundred hectares of forest were burnt in the fire; see also SLASH AND BURN*

◇ **burner reactor** *noun* normal type of nuclear reactor, in which fuel, such as uranium-239, is used to generate heat by fission

◇ **burn-up** *noun* amount of fuel burnt in a nuclear reactor, shown as a proportion of the fuel originally used

bush *noun* (a) low shrub or small tree; a *coffee bush* (b) (in semi-arid regions) the bush = wild land covered with bushes and small trees; **bush-fallow** = cultivation system where trees and bushes are cleared from virgin land which is then left fallow for a period before cultivation starts

butane *noun* gas produced during petroleum distillation, used domestically for heating and sold in special containers as bottled gas

butylated hydroxytoluene (BHT) *noun* common antioxidant additive (E321) used in processed foods containing fat, probably carcinogenic

Buys Ballot's Law *noun* rule for identifying low pressure areas (based on the Coriolis effect) that in the Northern Hemisphere, if the wind is blowing from behind you, then the low pressure area is to the left, while in the Southern Hemisphere it is to your right

BWR = BOILING WATER REACTOR

by-pass 1 *noun* road built around a town, to relieve traffic congestion; *since the by-pass was built, traffic in the town has been reduced by half* **2** *verb* to avoid by going around; *they by-passed the normal complaints procedure and went straight to the director of the chemical company; the plans are to build a new main road, by-passing the town*

by-product *noun* something additional produced during process

byssinosis *noun* lung disease (a form of pneumoconiosis) caused by inhaling cotton dust

Cc

C 1 *abbreviation for Celsius* 2 *chemical symbol for carbon* 3 *noun Vitamin C or ascorbic acid* = vitamin which is soluble in water, and is found in fresh fruit (especially oranges and lemons) and in raw vegetables, liver and milk

COMMENT: lack of Vitamin C can cause anaemia and scurvy

Ca *chemical symbol for calcium*

cactus *noun* succulent plant with a fleshy stem (often protected by spines), found in the deserts of North and Central America

NOTE: plural is **cacti** or **cactuses**

cadmium *noun* metallic element which is naturally present in soil and rock in association with zinc NOTE: chemical symbol is **Cd**; atomic number is 48

COMMENT: cadmium is used for making rods for nuclear reactors. It is also present in tobacco smoke, and is found in fish and shellfish such as oysters

caesium *noun* metallic alkali element, which is one of the main radioactive pollutants which is taken up by fish

NOTE: chemical symbol is **Cs**; atomic number is 55

caffeine *noun* alkaloid found in coffee, chocolate and tea, which acts as a stimulant

COMMENT: apart from acting as a stimulant, caffeine also helps in the production of urine. It can be addictive, and exists in both tea and coffee in about the same percentages as well as in chocolate and other drinks

Cal *abbreviation for kilocalorie*

calcareous *adjective* (soil) containing calcium or chalky (soil); (rock such as chalk or limestone) containing calcium

calcicole or **calciphile** or **calcicolous** *plant* *noun* plant which grows well on chalky or alkaline soils

calcification *noun* hardening by forming deposits of calcium salts

◇ **calcified** *adjective* made hard

◇ **calcifuge** or **calciphobe** *noun* plant which prefers acid soils and cannot exist on chalky or alkali soils

◇ **calcimorphic soil** *noun* soil which is rich in lime

◇ **calciphile** *see* CALCICOLE

◇ **calciphobe** *see* CALCIFUGE

calcium *noun* metallic chemical element which is naturally present in limestone, chalk and is essential to biological life (it is a major component of bones and teeth); **calcium carbonate** = chalk or white mineral found widely in many parts of the world, formed from animal organisms; **calcium cycle** = cycle of events by which calcium in the soil is taken up into plants, passed to animals which eat the plants, and then passed back to the soil again when the animals die and decompose; **calcium hydroxide** = slaked lime or mixture of calcium oxide and water, used on soils to improve their quality; **calcium oxide** = quicklime or chemical used in many industrial processes and also spread on soil to reduce acidity

NOTE: chemical symbol is **Ca**; atomic number is 20

COMMENT: calcium is essential for various bodily processes such as blood clotting, and is an important element in a correct diet. Milk, cheese, eggs and certain vegetables are its main sources. In birds calcium is responsible for the formation of strong egg shells. Water which passes through limestone contains a high level of calcium and is called "hard"

calm *noun* period when there is no wind at all; *see also* BEAUFORT SCALE

calomel *noun* mercury chloride, used to kill moss on lawns and to treat pinworms in the intestine

calor *noun* heat

◇ **caloric** *adjective* referring to calories; **caloric requirement** = amount of energy (shown in calories) which an animal such as a human needs each day

◇ **calorie** or **gram calorie** *noun* unit of measurement of heat or energy NOTE: the **joule** is now more usual

◇ **Calorie** or **large calorie** *noun* kilocalorie or 1,000 calories NOTE: spelt with a capital. Also written **cal** after figures: **250 cal**

◇ **calorific value** *noun* heat value of a substance or number of Calories which a certain amount of a substance (such as a certain food) contains; *the tin of beans has 250 calories or has a calorific value of 250 calories*

COMMENT: one calorie is the amount of heat needed to raise the temperature of one gram of water by one degree Celsius. A Calorie or kilocalorie is the amount of heat needed to raise the temperature of a kilogram of water by one degree Celsius. The Calorie is also used as a measurement of the energy content of food and to show the caloric requirement, or amount of energy needed by an average person. The average adult in an office job, requires about 3,000 Calories per day, supplied by carbohydrates and fats to give energy and proteins to replace tissue. More strenuous physical work needs more Calories. If a person eats more than the number of Calories needed by his energy output or for his growth, the extra Calories are stored in the body as fat

calyx *noun* part of a flower shaped like a cup, made up of the green sepals which cover the flower when it is in bud NOTE: the plural is **calyces**

camouflage 1 *noun* hiding of an animal's shape by colours or patterns; *the stripes on the zebra are a form of camouflage which makes the animal less easy to see in long grass* 2 *verb* to hide the shape by using colours or patterns on the skin

canal *noun* (i) waterway made by people for ships to travel along; (ii) waterway made by people to take water to irrigate land

can bank *noun* large container into which people put cans which are then recycled

COMMENT: aluminium cans are particularly valuable and can be collected separately. Other cans are made of ferrous metals and can be separated by testing with a magnet

cancer *noun* (a) **Tropic of Cancer** = parallel running round the earth at latitude 23° 28'N (b) malignant growth or tumour, which develops in tissue and destroys it, which can spread by metastasis to other parts of the body and cannot be controlled by the body itself; *he has been diagnosed as having lung cancer or as having cancer of the lung*

◇ **cancerous** *adjective* referring to cancer; *the X-ray revealed a cancerous growth in the breast*

COMMENT: cancers can be divided into cancers of the skin (carcinomas) or cancers of connective tissue, such as bone or muscle (sarcomas). Cancer can be caused by tobacco, radiation, certain diets, and many other factors. Many cancers are curable by surgery, by chemotherapy or by radiation, especially if they are detected early

candela *noun* base SI unit of measurement of light intensity

CANDU *noun* CANADIAN DEUTERIUM-URANIUM REACTOR

COMMENT: the CANDU reactor uses uranium oxide as fuel and heavy water as moderator and coolant

canker *noun* disease causing lesions on the outer surface of a plant

cannabis or **hemp** *noun* Indian hemp plant which gives an addictive drug (marijuana)

canopy *noun* leaves of trees which act as an umbrella over the ground beneath; **canopy cover** = percentage of the surface of the ground which is covered by the leaves of trees

QUOTE trees that grow to form the tallest part of the canopy suffer more damage than the slower growing trees forming the understorey
Guardian

canyon *noun* deep valley with steep sides (usually in North America)

capillary *noun* (a) tiny tube carrying a liquid in an organism (b) capillary flow = movement of a liquid upwards inside a narrow tube or upwards through the soil

◇ **capillarity** *noun* = CAPILLARY FLOW

Capricorn *noun* Tropic of Capricorn = parallel running round the earth at latitude 23° 28'S

capsid bug *noun* tiny insect which sucks the sap of plants

capsular *adjective* referring to a capsule

◇ **capsule** *noun* (a) membrane round an organ or egg, etc. (b) dry seed case which bursts open to allow the seeds to shoot out

caramel *noun* burnt sugar or colouring additive (E150) which is believed to be carcinogenic

carbamate *noun* type of pesticide or insecticide developed to replace organochlorines such as DDT

COMMENT: the advantage of carbamates over DIT is that they are not persistent and do not enter the human food chain

carbohydrates *noun* organic compounds which derive from sugar and which are the main ingredients of many types of food

COMMENT: carbohydrates are compounds of carbon, hydrogen and oxygen. They are found in particular in sugar and starch, and provide the body with energy

carbon *noun* one of the common non-metallic elements, an essential component of living matter and organic chemical compounds; **carbon cycle** or **circulation of carbon** = carbon atoms from carbon dioxide are incorporated into organic compounds in plants during photosynthesis. They are then oxidized into carbon dioxide again during respiration by the plants or by herbivores which eat them and by carnivores which eat the herbivores, thus releasing carbon to go round the cycle again; **carbon dating** or **carbon-14 dating** = process of finding out how old something is by analyzing the amount of carbon dioxide in it which has decayed; **carbon sink** = part of the biosphere (such as a tropical forest) which absorbs carbon, as opposed to animals which release carbon into the atmosphere in the form of carbon dioxide
NOTE: chemical symbol is **C**

◇ **carbonaceous** *adjective* (rock, such as coal) which is rich in hydrocarbons

◇ **carbonate 1** *noun* compound formed from a base and carbonic acid; **calcium carbonate** = chalk or white mineral found widely in many parts of the world, formed from animal organisms **2** *verb* to add carbon dioxide to a drink to make it fizzy

◇ **carbonization** *noun* process by which fossil plants have become carbon

carbon dioxide (CO₂) *noun* colourless gas produced when carbon is burnt with oxygen.

COMMENT: Carbon dioxide exists naturally in air and is produced by burning or rotting organic matter. In animals, the body's metabolism makes the tissues burn carbon, which is then breathed out by the lungs as waste carbon dioxide. Carbon dioxide is removed from the atmosphere by plants when it is split by chlorophyll in photosynthesis to form carbon and oxygen. It is also dissolved from the atmosphere in sea water. The increasing release of carbon dioxide into the atmosphere, especially from burning fossil fuels, contributes to the greenhouse effect. Carbon dioxide is used in solid form as a means of keeping food cold. It is also used in fizzy drinks and has the E number 290. It is used as a coolant in some nuclear reactors

carbon monoxide (CO) *noun* poisonous gas found in fumes from car engines, from burning gas and cigarette smoke; **carbon monoxide poisoning** = poisoning caused by breathing carbon monoxide which starves the body of oxygen

COMMENT: Carbon monoxide combines very easily with haemoglobin in blood to form carboxyhaemoglobin, which has the effect of starving the tissues of oxygen. It exists in tobacco smoke (see **PASSIVE SMOKING**) and in car exhaust fumes

carboxyhaemoglobin *noun* compound of carbon monoxide and haemoglobin formed when a person breathes in carbon monoxide from car fumes or from ordinary cigarette smoke

carcin- *prefix* referring to cancer

◇ **carcinogen** *noun* substance which produces cancer

◇ **carcinogenic** *adjective* which produces cancer

COMMENT: carcinogens are found in pesticides such as DDT, in asbestos, aromatic compounds such as benzene, and radioactive substances

cardinal points *noun* the four points on the horizon which are used to show direction (north, south, east and west)

carnivore or **carnivorous animal** *noun* animal which eats meat; **social carnivores** = meat-eating animals which live and hunt in groups, such as lions, wolves, etc.; *compare* **HERBIVORE**, **OMNIVORE**

◇ **Carnivora** *noun* order of meat-eating animals, including dogs, cats, bears and seals

◇ **carnivorous** *adjective* which eats meat; **carnivorous animals** = **CARNIVORA**; **carnivorous plants** = plants which attract insects, trap them and then digest their bodies

carpel *noun* female part of a plant, formed of an ovary and stigma

carr *noun* type of fen which supports some trees

carrageenan *noun* Irish moss or an extract of seaweed (E407) used as an emulsifier, but possibly carcinogenic

carrier *noun* (a) person who carries bacteria of a disease in his body and who can transmit the disease to others without showing any sign of it himself (b) insect which carries disease and infects humans (c) healthy person who carries the chromosome defect of a hereditary disease (such as haemophilia)

◇ **carrying capacity** *noun* maximum number of individuals of a species that can be supported in a given area

cascade ¹ *noun* (a) small waterfall (b) system for purifying substances, where the substance passes through a series of identical processes, each stage increasing the level of purity ² *verb* (of liquid) to fall down like a waterfall

case *noun* (a) hard outer cover; seed case = hard outside cover which protects the seeds in certain plants; case hardened = soft steel which has been given a hard outside layer by heating with carbon (b) (i) single occurrence of a disease; (ii) person who has a disease or who is undergoing treatment; *there were two hundred cases of cholera in the recent outbreak*; case history = details of what has happened to a patient undergoing treatment

cash crops *noun* crops which are grown to be sold rather than eaten by the person who grows them

QUOTE in the Philippines as a whole, more than 30% of the total cultivated land area was given over to cash crop production for export in 1980, mainly bananas, pineapples and sugar cane

The Ecologist

caste *noun* social position or position in society; caste system = system where animals occupy different positions in a society (as in the case of bees, where there are three different groups - the queen, the workers (sterile females) and the drones (males))

catabolism *noun* breaking down of complex chemicals into simple chemicals

◇ **catabolic** *adjective* referring to catabolism

catadromous *adjective* (fish) which live in fresh water and go into the sea to spawn

◇ **catadromy** *noun* migration of fish (such as eels) from fresh water to the sea for spawning; see also ANADROMY, ANADROMOUS

catalysis *noun* process where a chemical reaction is helped by a substance (the catalyst) which does not change during the process

◇ **catalyst** *noun* substance which produces or helps a chemical process without itself changing; *the sun acts as a catalyst in forming ozone*; *an enzyme which acts as a catalyst in the digestive process*

◇ **catalytic** *adjective* referring to catalysis; catalytic reaction = chemical reaction which is caused by a catalyst, which does not change during the reaction; catalytic converter or also US catalytic muffler = device attached to the exhaust pipe of a car which reduces the emission of carbon monoxide

◇ **catalyze** *verb* to act as a catalyst or to help make a chemical process take place

COMMENT: a catalytic converter is a box filled with a catalyst, such as platinum. Converters can only be used on cars burning unleaded petrol, as the lead compounds in leaded petrol rapidly coat the catalyst in the converter and prevent it functioning

catch ¹ *noun* amount of fish caught; regulations to limit the herring catch ² *verb* to hunt and take animals (usually fish)

QUOTE more than 10,000 fishermen here used to produce about 11 per cent of the fish catch of the entire country

Guardian

catchment (area) *noun* area of land which collects and drains the water which falls on it (such as the area round a lake or the basin of a river)

catch-water drain *noun* type of drain designed to take rainwater from sloping ground

catena *noun* diagram showing the differences in soil caused by drainage

cation *noun* ion with a positive electric charge; cation exchange = exchange which takes place when the ions of calcium, magnesium and other metals found in soil replace the hydrogen ions in acid

catkin *noun* long structure consisting of many flowers (found on certain temperate trees such as hazel, birch and oak)

cattle *noun* domestic farm animals of the class Bovidae, raised for their milk and meat; *the herdsmen drive their herds of cattle across the plain*; *thousands of cattle have died in the drought*

caustic *adjective* acid (substance); caustic soda = sodium hydroxide or compound of sodium and water which is used to make soap and to clear drains; caustic lime = quicklime or calcium oxide

cave *noun* large hole under the ground, usually in rock

◇ **cavern** *noun* very large cave, formed by water which has dissolved limestone or other calcareous rock

cavity *noun* hole inside a solid substance; cavity insulation = insulation of cavity walls by putting insulating material inside them; cavity walls = walls made of two ranges of bricks, with a space in between them, giving greater insulation

Cd *chemical symbol for cadmium*

cedar *noun* American red wood, soft, but resistant to water and now becoming scarce

ceiling *noun* upper layer or level; **cloud ceiling** = height of cloud cover

celestial *adjective* referring to the sky; **celestial equator** = imaginary line in the sky above the earth's equator

cell *noun* tiny unit of matter which is the base of all plant and animal tissue; **cell division** = way in which a cell reproduces itself by mitosis; **cell membrane** = membrane enclosing the cytoplasm of a cell; **cell wall** = outside wall of a plant cell, formed of cellulose; **daughter cell** = one of the cells which develop by mitosis from a single parent cell; **mast cell** = large cell in connective tissue, which carries histamine and reacts to allergens; **mother cell** or **parent cell** = original cell which splits into daughter cells by mitosis; **receptor cell** = cell which senses a change in the surrounding environment (such as cold or heat) and reacts to it by sending an impulse through the nervous system to the brain

◇ **cellular** *adjective* (a) referring to cells or formed of cells (b) made of many similar parts connected together; **cellular tissue** = form of connective tissue with large spaces

COMMENT: the cell is a unit which can reproduce itself. It is made up of a jelly-like substance (cytoplasm) which surrounds a nucleus, and contains many other small organisms which vary according to the type of cell. Cells reproduce by division (mitosis). Some microorganisms are formed of a single cell, but most organisms are formed by the division and reproduction of many millions of cells.

cellulose *noun* (a) carbohydrate which makes up a large percentage of plant matter, especially cell walls (b) chemical substance processed from wood, used for making paper, film and artificial fibres

COMMENT: cellulose is not digestible, and is passed through the digestive system as roughage

Celsius *noun* scale of temperature where the freezing and boiling points of water are 0° and 100°

NOTE: used in many countries, but not in the USA, where the Fahrenheit system is still preferred. Normally written as a °C after the number 52°C (say 'fifty-two degrees Celsius'). Used to be called **centigrade**

COMMENT: to convert Celsius temperatures to Fahrenheit, multiply by 1.8 and add 32. So 20°C is equal to 68°F

cement *noun* (a) material which binds things together, such as that which binds minerals together to form sedimentary rocks (b) powder, which if mixed with water and then dried, sets hard like stone (used in building)

COMMENT: various types of cement are used in construction. The commonest is made of burnt lime with clay and other mineral compounds. High alumina cement is used in stressed concrete and is made from ground bauxite

centigrade *noun* scale of temperature where the freezing and boiling points of water are 0° and 100°; see note at CELSIUS

centimetre or **US centimeter** *noun* measurement of length (one hundredth of a metre)

NOTE: centimetre is usually written **cm** with figures

central *adjective* referring to the centre; **central nervous system (CNS)** = the brain and spinal cord which link together all the nerves

◇ **centre** or **US center** *noun* (a) middle point or main part; **the centre of the hurricane passed over the city**; **a park is to be built in the centre of the town** (b) large building; **research centre** = place where scientific research is carried out

centrifugal *adjective* which goes away from the centre; **centrifugal force** = force which pulls a body away from the centre of a curved path

◇ **centrifuge** *noun* device to separate the components of a liquid

centriole *noun* small structure found in the cytoplasm of a cell, which forms asters during cell division

centripetal *adjective* which goes towards the centre; **centripetal force** = force which attracts a body towards the centre of a curved path

centrosome *noun* structure of the cytoplasm in a cell, near the nucleus, and containing the centrioles

cephal- *prefix* referring to the head

◇ **cephalic** *adjective* referring to the head; **cephalic index** = measurement of the shape of the skull

◇ **cephalopods** or **Cephalopoda** *noun* class of mollusc (such as an octopus or squid) which has a large head and a shell inside the soft body

cereal *noun* plants whose seeds are used for food, especially to make flour; **the Common Market grows large quantities of cereals** (b) food made of seeds of corn, etc. which is

usually eaten at breakfast; *he ate a bowl of cereal; put milk and sugar on your cereal*

COMMENT: cereal plants are all members of the Graminales family or grasses. The commonest are oats, wheat, barley, maize and rye in colder temperate areas, and rice and sorghum in warmer regions

cerebellar *adjective* referring to the cerebellum

◇ **cerebellum** *noun* section of the hindbrain, located at the back of the head beneath the back part of the cerebrum

COMMENT: the cerebellum is formed of two hemispheres, with the vermis in the centre. The cerebellum is the part of the brain where voluntary movements are coordinated and is associated with the sense of balance

cerebr- or **cerebro-** *prefix* referring to the cerebrum

◇ **cerebral** *adjective* referring to the cerebrum or to the brain in general; **cerebral hemisphere** = one of the two halves of the cerebrum

cerebrospinal *adjective* referring to the brain and the spinal cord; **cerebrospinal fluid (CSF)** = fluid which surrounds the brain and the spinal cord

COMMENT: CSF is found in the space between the arachnoid mater and pia mater of the brain, between the ventricles of the brain, and in the central canal of the spinal cord. CSF consists mainly of water, with some sugar and sodium chloride. Its function is to cushion the brain and spinal cord

cerebrum *noun* main part of the brain

COMMENT: the cerebrum is the largest part of the brain, formed of two sections (the cerebral hemispheres) which run along the length of the head. The cerebrum controls the main mental processes, including the memory

certificate *noun* official paper which states something; **birth certificate** = paper giving details of a person's date and place of birth and parents; **death certificate** = paper signed by a doctor, stating that a person has died and giving details of the person

◇ **certify** *verb* to make an official statement in writing

cesspool or **cesspit** *noun* septic tank or tank in the ground which collects sewage from a house, and from which the sewage gradually seeps away, not connected to a mains drainage system

Cetacea or **cetaceans** *noun* large mammals which live in the sea, such as dolphins, porpoises and whales

CFC = **CHLOROFLUOROCARBON**

chain *noun* (i) number of metal rings attached together to make a line; (ii) number of components linked together or number of connected events; **chain reaction** = (i) nuclear reaction where a neutron hits a nucleus, makes it split, and so releases further neutrons; (ii) chemical reaction where each stage is started by a chemical substance which reacts with another, producing further substances which can continue the reaction; **food chain** = series of organisms which pass energy from one to another as each provides food for the next (the first organism in the food chain is the producer, and the rest are consumers)

chalk *noun* fine white limestone rock formed of calcium carbonate

◇ **chalky** *adjective* (soil) full of chalk

COMMENT: chalk is found widely in many parts of Northern Europe. Formed from animal organisms it is also used as an additive (E170) in white flour

channel 1 *noun* (a) deep part of a harbour or sea passage where ships can pass; stretch of water between two seas (b) bed of a river or the ground across which a river or stream flows; **drainage channel** = small ditch made to remove rainwater from the soil surface **2 verb** to send (water) in a particular direction

◇ **channelize** *verb* to straighten a stream which has many bends, so as to make the water flow faster

character *noun* way in which a person thinks and behaves

◇ **characteristic 1** *adjective* typical or special; **characteristic species** = species typical of and only occurring in a certain region **2 noun** quality or trait that distinguishes something; *one of the characteristics of the squid is that it can send out a cloud of ink when attacked*

◇ **characterize** *verb* to be a characteristic of; *deserts are characterized by little rainfall, arid soil and very little vegetation*

charcoal *noun* impure form of carbon, formed when wood is burnt in the absence of oxygen; **activated charcoal** = form of carbon to which gases can stick, used as a filter to control pollution

chart 1 *noun* (a) map of an area of water, such as the sea or a large lake (b) diagram or record of information shown as a series of lines or points on graph paper; *a chart showing the increase in cases of lung cancer; this chart shows the extent of forest areas affected by acid rain; temperature chart* = chart showing changes in

temperature over a period of time. **weather chart** = chart showing the state of the weather at a particular moment → changes which are expected to happen in the weather in the near future **2 verb** to make a chart

chem- prefix referring to chemistry or chemicals

◇ **chemical 1 adjective** referring to chemistry; **chemical closet** = **chemical toilet** = toilet closet used without running water, in which faeces are covered with chemicals; **chemical compound** = substance formed from two or more chemical elements, in which the proportions of the elements are always the same; **chemical elements** = the 105 different substances which exist independently and cannot be broken down to simpler substances; see PERIODIC TABLE; **chemical mutagen** = chemical substance which causes mutation; **chemical oxygen demand (COD)** = amount of oxygen taken up by organic matter in water (used as a measurement of the amount of organic matter in sewage); **chemical symbol** = letter (or letters) used to indicate an element (used especially in formulae, C for carbon, Co for cobalt, etc.) **2 noun** substance produced by a chemical process → formed of chemical elements; *the widespread use of chemicals in agriculture*

◇ **chemist noun** (a) scientist who specializes in the study of chemistry (b) **dispensing chemist** = pharmacist who prepares and sells drugs according to doctors' prescriptions

◇ **chemistry noun** (a) study of substances, elements and compounds and their reactions with each other; **blood chemistry** → **chemistry of the blood** = record of the changes which take place in blood during disease and treatment (b) chemical substances existing together; *human action has radically altered the chemistry of the atmosphere*

chemo- prefix referring to chemistry

◇ **chemoautotrophic bacteria** noun bacteria which make protoplasm using energy from chemical (as opposed to phototrophic) reactions

◇ **chemolithotrophic adjective** (organisms, such as bacteria) which obtain energy from inorganic substances

◇ **chemo-organotrophic adjective** (organism) which obtains its energy from organic sources (all animals are chemo-organotrophic)

◇ **chemoreceptor noun** cell which responds to the presence of a chemical compound by activating a sensory nerve (such as a taste bud reacting to food); see also EXTEROCEPTOR, INTEROCEPTOR, RECEPTOR

◇ **chemosphere noun** zone in the earth's atmosphere, above the upper part of the troposphere and within the stratosphere, where chemical changes take place under the influence of the sun's radiation

◇ **chemotaxis noun** movement of a cell which is attracted to → repelled by a chemical substance

◇ **chemotrophic adjective** (organism) which takes energy not from light, but from other sources such as organic matter (almost all animals are chemotrophic, while plants are phototrophic)

Chernobyl noun name of a large nuclear power station in the Soviet Union, the scene of a disastrous fire in 1986

chernozem noun dark fertile soil, full of organic matter above a lighter lime soil

COMMENT: chernozem is found in the temperate grass-covered plains of Russia and North and South America

chestnut noun European hardwood tree

chill noun coldness; **wind chill factor** = way of calculating the risk of exposure in cold weather by adding the speed of the wind to the number of degrees of temperature below zero

◇ **chillshelter** noun form of feedlot, where a small area of land for the intensive fattening of cattle is surrounded by a high embankment to protect the cattle against the cold

chimney noun tall tube, either inside a building or separate from it, which takes smoke and fumes away from a fire; *smoke poured out of the factory chimneys; chimneys were built very tall, so that the polluting smoke would be carried a long way away by the wind; chimney stack* = very tall chimney, as in a factory, usually containing several flues

china clay noun kaolin or fine white clay used for making pure white china, also used for coating shiny paper

China syndrome noun imaginary potential disaster where the core of a nuclear reactor overheats

COMMENT: according to the China syndrome, the core of the reactor melts its surroundings, and sinks into the earth with such energy that it would supposedly burn its way through to China (the antipode of the USA). In reality it would not burn its way so far, but would heavily contaminate the environment of the reactor

chinook noun warm wind which blows from the Rocky Mountains down onto the Canadian plains in winter

chlor(o)- prefix (i) referring to chlorine; (ii) green

◇ **chloride** noun a salt which is a compound of chlorine; **sodium chloride** = common salt

◇ **chlorinated adjective** treated with chlorine; **chlorinated hydrocarbon insecticides** =

organochlorines or type of insecticide made synthetically as a compound of chlorine

COMMENT: chlorinated hydrocarbon insecticides include DDT, aldrin and lindane. These types of insecticide are very persistent, with a long half-life of up to 15 years, while organic phosphorous insecticides have a much shorter life. Chlorinated hydrocarbon insecticides not only kill insects, but also enter the food chain and kill small animals and birds which feed on the insects

chlorination *noun* sterilizing by adding chlorine

◇ **chlorinator** *noun* apparatus for adding chlorine to water

COMMENT: chlorination is used to kill bacteria in drinking water, in swimming pools, and sewage farms, and has many industrial applications such as sterilization in food processing

chlorine *noun* powerful greenish gas, used to sterilize water and to bleach; **chlorine demand** = amount of chlorine needed to kill bacteria in a given quantity of sewage; **chlorine monoxide** = substance which forms in the stratosphere and destroys ozone **NOTE:** symbol is **Cl**; atomic number is 17

QUOTE chlorine monoxide, at the concentrations found over the Antarctic in spring, destroys ozone at a rate of about 2 per cent per day

New Scientist

chlorofluorocarbon (CFC) *or*
chlorofluoromethane (CFM) *noun*
compound of fluorine and chlorine, used as a propellant in aerosol cans, in the manufacture of plastic foam boxes for takeaway food, as a refrigerant in refrigerators and air conditioners and as cleaners of circuit boards for computers

QUOTE he plans to publish lists of aerosols detailing their use of CFCs. As products become CFC-free, they will be removed from the list

Independent

QUOTE the electronics industry accounts for some 45% of the use of CFC-13, which is used mainly to clean printed circuit boards

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QUOTE it remains to be seen if alternatives will prove satisfactory for use as solvents in electronics manufacture or as blowing agents for making cushioning foams - two of the principal uses of CFCs at present. CFCs are valuable in these areas because they are relatively non-toxic, non-flammable and stable

Environment Now

QUOTE no other chemicals in the home are as harmless as CFCs, and few so useful in their role as the working fluids of refrigerators

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COMMENT: CFCs are classified by numbers: CFC-10 is used in aerosols; CFC-11 is used to make plastic foam; CFC-12 is a coolant for refrigerators; CFC-13 is the cleaning substance used in the electronics industry. When CFCs are released into the atmosphere, they rise slowly taking about seven years to reach the stratosphere. But once they are there, under the influence of the sun's ultraviolet light they break down into chlorine atoms which destroy the ozone layer. This allows harmful solar UV radiation to pass through to the earth's surface. Because it takes so long for the CFCs to reach the stratosphere, any reduction in their use on earth does not have an immediate effect on the concentrations in the stratosphere. Replacements for CFCs are being developed, which should reduce the problem eventually. It is a pity that CFCs have this unfortunate effect on the ozone layer, since in other ways they are ideal gases, being stable and non-toxic

chloromethane *noun* gas (compound of carbon and chlorine) formed by fungi as they rot wood, which acts in a similar way to CFCs in depleting the ozone layer

chlorophyll *noun* green pigment in plants

◇ **Chlorophyta** *noun* green algae, the largest class of algae

◇ **chlorosis** *noun* reduction of chlorophyll in plants, making the leaves turn yellow

COMMENT: chlorophyll absorbs light energy from the sun and supplies plants with the energy to enable them to carry out photosynthesis. It is also used as a colouring (E140) in processed food

choke *verb* to kill a living organism by cutting off air or other life-giving substances;

the reservoirs became choked with rapidly-growing weeds; the centre of the town is choked with traffic

cholera *noun* serious bacterial disease spread through food or water which has been infected by *Vibrio cholerae* *a cholera epidemic broke out after the flood*

COMMENT: the infected person suffers diarrhoea, cramp in the intestines and dehydration. The disease is often fatal and vaccination is only effective for a relatively short period

cholesterol *noun* fatty substance found in fats and oils, also produced by the liver, and forming an essential part of all cells

COMMENT: cholesterol is formed by the body and is found in brain cells, the adrenal glands, liver and bile acids. High levels of cholesterol in the blood are found in diabetes. High blood cholesterol levels are associated with diets rich in animal fat (such as butter and fat meat). Excess cholesterol can be deposited in the walls of arteries, causing atherosclerosis

CHP = COMBINED HEAT AND POWER; **CHP plant** = power station which produces both electricity and heating water for the local population

chrom- *prefix* referring to colour

chromatid *noun* one of two parallel filaments making up a chromosome

◇ **chromatin** *noun* network which forms the nucleus of a cell and can be stained with basic dyes; **sex chromatin** = chromatin which is only found in female cells, and which can be used to identify the sex of a baby before birth

chromatography *noun* method of separating chemicals through a porous medium and analysing compounds

chromatophore *noun* (a) any cell which contains pigment, such as the cells in the eyes, hair and skin, or the cells by which an animal such as the chameleon can change colour (b) cell in plants or algae which contains chlorophyll

chromium *noun* metallic trace element, used to make alloys

NOTE: the chemical symbol is **Cr**; atomic number is 24

chromosome *noun* rod-shaped structure in the nucleus of a cell, formed of DNA which carries the genes

◇ **chromosomal** *adjective* referring to chromosomes

COMMENT: each species has its own chromosomal make-up. The human cell has 46 chromosomes, 23 inherited from each parent. Among these are the X and Y chromosomes, which are responsible for sexual differences. The female has one pair of X chromosomes, and the male one X and one Y chromosome. Sperm carry either an X or a Y chromosome. If a sperm with a Y chromosome fertilizes a female's ovum the resulting offspring will be a male (XY); otherwise it will be a female (XX)

chronic *adjective* (disease or condition) which lasts for a long time; *the forest was suffering from chronic soil acidification; compare ACUTE*

chrysalis *noun* stage in the development of a butterfly or moth, the hard case in which the pupa is protected

Chrysophyta *noun* golden-brown algae, which store oil in their cell walls

Ci *abbreviation* for curie

-cide *suffix* referring to killing; **herbicide** = substance which kills plants

cilia *see* CILIUM

◇ **ciliary** *adjective* referring to cilia; **ciliary feeders** = molluscs which feed by sucking water and the organisms it contains through cilia

◇ **ciliated epithelium** *noun* simple epithelium where the cells have tiny hairs or cilia

◇ **cilium** *noun* one of many tiny hair-like processes which line cells in passages in the body and by moving backwards and forwards drive particles or fluid along the passage

NOTE: plural is **cilia**

cinders *noun* hot waste which is thrown up by an erupting volcano or taken out of a furnace

circadian rhythm *noun* rhythm of daily activities and bodily processes (eating or defecating or sleeping, etc.) frequently controlled by hormones, which repeats every twenty-four hours and is found both in plants and animals

circulate *verb* (of air or fluid) to move around in a circle; *a circulation of cold air across the British Isles; blood circulates around the body*

◇ **circulation** *noun* (i) movement of air in a circle; (ii) movement of blood around the body from the heart through the arteries to the capillaries and back to the heart through the veins

◇ **circulatory** *adjective* referring to the circulation of the blood; **circulatory system** =

system of arteries and veins, together with the heart, which makes the blood circulate around the body

COMMENT: blood circulates around the body, carrying oxygen from the lungs and nutrients from the liver through the arteries and capillaries to the tissues. The capillaries exchange the oxygen for waste matter such as carbon dioxide which is taken back to the lungs to be expelled. At the same time the blood obtains more oxygen in the lungs to be taken to the tissues

circum- prefix meaning around

◇ **circumpolar** *adjective* around the North or South Pole; **circumpolar vortex** = high jet stream which moves around the poles

cirrocumulus *noun* form of high cloud, occurring above 5,000m, like altocumulus with little clouds

◇ **cirrostratus** *noun* high layer of cloud veil

◇ **cirrus** *noun* high (above 5,000m) mass of separate clouds which look as if they were made of fibres, in fact formed of ice crystals

citric acid *noun* acid found in fruit such as oranges, lemons and grapefruit

◇ **citric acid cycle** or **Krebs cycle** *noun* important series of reactions in which the intermediate products of fats, carbohydrates and amino acid metabolism are converted to carbon dioxide and water in the mitochondria

Cl *chemical symbol for chlorine*

cladding *noun* material which is put round something to protect it, such as material put on the outside of buildings, or round pipes or tanks to prevent heat loss; *the hot-water tank needs to be insulated with at least 10cm of cladding; cladding is used in nuclear reactors to separate the nuclear fuel rods from the coolant*

clarification *noun* process of removing solid waste matter from sewage

class *noun* one of the divisions into which organisms are categorized; *groups of families are classified into orders, and groups of orders into classes*

◇ **classify** *verb* (a) to arrange in classes; *the area has been classified as an Area of Outstanding Natural Beauty* (b) to put references or components into order so as to be able to refer to them again; *the pollution records are classified under the name of the site which has been polluted; blood groups are classified according to the ABO system* (c) to make information secret; *the reports on the accident are classified and may not be consulted by the public*

◇ **classification** *noun* system by which things are put into an order to be identified easily; *the Linnaean classification of plants and animals; the ABO classification of blood*

clay *noun* type of heavy non-porous soil, occurring above fine particles of silicate

◇ **clayey** *adjective* made of clay; *these plants do best in clayey soils*

◇ **claypan** *noun* hollow on the surface of clay land where rain collects

clean 1 *adjective* not dirty; **clean air** = air which does not contain impurities or air which is free from pollution; **clean power station** = power station which gives off little pollution or radiation **2** *verb* to make clean, by taking away dirt or impurities

◇ **cleanse** *verb* to make very clean

◇ **cleanser** *noun* powder or liquid which cleanses

◇ **clean up** *verb* to remove refuse or waste substances or pollutants from a place; *they are working to clean up the beaches after the oil spill*

◇ **clean-up** *noun* action of removing pollutants; *the local authorities have organized a large-scale clean-up of polluted beaches*

clear 1 *adjective* (a) easily understood; *there's no clear way of explaining the problem* (b) which is not cloudy and which you can easily see through; *acid rain turns lakes crystal clear; clear air* = air with no mist or smoke; *clear sky* = sky with no clouds (c) clear of = free from; *the area is now clear of pollution* **2** *verb* to remove things which are in the way to make space for something else; *they cleared hectares of jungle to make a new road to the capital; we are clearing rainforest at a faster rate than before*

◇ **clearance** *noun* act of clearing something away

◇ **clearcut 1** *noun* cutting of all the trees in an area **2** *verb* to clear an area of forest by cutting all the trees; *see also CUT*

◇ **clearcutting** *noun* method of harvesting timber, where all the trees in an area are cut down at the same time

◇ **clearfell** *verb* to clear an area of forest by felling all the trees; *the greatest threat to wildlife is the destruction of habitats by clearfelling the forest for paper pulp*

◇ **clearly** *adverb* plainly or obviously

COMMENT: clearcutting is a way of managing a forest. Once the felled timber has been removed, the land is cleared of stumps and roots, and then sown with new tree seed

cliff *noun* high wall of rock by the sea or along a canyon; *many types of birds nest on ledges in the cliffs*

climate *noun* general weather of a certain place; **continental climate** = type of climate found in the centre of a large continent away from the sea, where winters are very cold and summers very hot, with not much rain; **temperate climate** = type of climate where there are no extremes of temperature between winter and summer

◇ **climatic** *adjective* referring to climate; **climatic climax** = climax which is controlled by climatic factors; **climatic factors** = conditions of climate which affect the organisms which live in a certain area

◇ **climatic zone** *noun* one of the eight areas of the earth which have distinct climates

COMMENT: the climatic zones are: the arctic (covering the two polar regions); the boreal in the Northern Hemisphere, south of the arctic; two temperate zones in the Northern and Southern hemispheres; two subtropical zones, including the deserts; and the equatorial zone which has a damp tropical climate

climatological *adjective* referring to climatology; *scientists have gathered climatological statistics from weather stations all round the world*

◇ **climatologist** *noun* scientist who specializes in the study of the climate

◇ **climatology** *noun* scientific study of the climate

COMMENT: climate is influenced by many factors, in particular the latitude of the region, whether it is near the sea or far inland, the altitude, etc.

climax *noun* final stable state in the development of an ecosystem; **climax community** = plant community which has been stable for many years and which is unlikely to change unless the climate changes or there is human interference; **edaphic climax** = climax caused by the type of soil in a certain area

cline *noun* changes which take place in a species according to the environment in which it lives; *see also* ECOCLINE, GEOCLINE

clinker *noun* lumps of ash and hard residue from furnaces, used to make road surfaces or breeze-blocks

clisere *noun* succession of communities which is influenced by the climate of an area

clone 1 *noun* (i) group of cells derived from a single cell by asexual reproduction and so identical to the first cell; (ii) organism produced asexually (as by taking cuttings of a plant) NOTE: the word originally referred to a group of cells derived from the same source, but is now used in the singular to refer to a single

organism 2 *verb* to reproduce an individual organism by asexual means

◇ **cloning** *noun* method of making an exact copy of a living organism by asexual reproduction

Clostridium *noun* type of bacterium

COMMENT: species of Clostridium cause botulism, tetanus and gas gangrene, but also increase the nitrogen content of soil

cloud *noun* (a) mass of water vapour or ice particles in the sky which can produce rain (b) mass of particles suspended in the air; *clouds of smoke poured out of the factory chimney; the eruption sent a cloud of ash high into the atmosphere; dust clouds swept across the plains*

NOTE: as a plural, **clouds** means several separate clouds; otherwise the singular can be used to refer to a large continuous mass: **there is a mass of cloud over the southern part of the country**

◇ **cloudbank** *noun* mass of low clouds

◇ **cloudbase** *noun* the bottom part of a layer of cloud

◇ **cloudburst** *noun* sudden rainstorm

◇ **cloud chamber** *noun* piece of laboratory equipment in which clouds can be formed for the study of ionization

◇ **cloud cover** *noun* amount of sky which is covered by clouds; *see also* OKTA

◇ **cloudlayer** *noun* mass of clouds at a certain height above the land

◇ **cloudless** *adjective* (sky) with no clouds

◇ **cloudy** *adjective* (sky) covered with clouds

COMMENT: clouds are formed as humid air rises and then cools. They are classified by meteorologists into ten categories: high clouds (cirrus, cirrocumulus, cirrostratus); middle clouds (altocumulus, altostratus, nimbostratus); low clouds (stratocumulus, stratonimbus, cumulus and cumulonimbus)

clump 1 *noun* group of particles which stick together 2 *verb* (of particles) to stick together in groups

CNS = CENTRAL NERVOUS SYSTEM

Co *symbol* for cobalt

coagulate *verb* to change from being liquid to semi-solid when suspended particles clump together; *blood coagulates in contact with air*

◇ **coagulant** *noun* substance which can make blood coagulate

◇ **coagulation** *noun* (of a liquid) becoming semi-solid

coal *noun* solid black organic substance found in layers underground in most parts of the world, burnt to provide heat or power;

coal-fired power station *n* power station which burns coal, as opposed to a gas-fired station or nuclear power station; **coal gas** *n* gas produced by processing coal, giving coke as a residue; **coal seam** *n* layer of coal in the rocks beneath the earth's surface; **coal tar** *n* any of several liquids formed by distillation of coal, used in the pharmaceutical industry and as preservatives for wood

COMMENT: coal was formed many millions of years ago from organic refuse deposited in swamps. Decaying plants formed peat, which was pressed by other layers of deposits to form first lignite (or brown coal) and then coal itself. Coal is composed mainly of carbon. It can be classified into various grades: lignite, or brown coal, is soft and not a very efficient fuel. Bituminous coals are harder and contain more carbon. Anthracite is the hardest coal, being almost pure carbon, and is the most efficient producer of heat. Coal is used commercially to fuel power stations, to burn to produce gas and to make coke, which burns at a higher temperature and is used in metal refining. It is also processed to make various forms of smokeless fuels used in domestic heating appliances. Coal affects the environment in two ways: (a) in the mining process, waste material can create ugly slag heaps and can contaminate rivers; old mines create subsidence as they fill in, (b) burning coal emits toxic smoke, especially sulphur oxides and fly ash, together with carcinogenic substances such as benzo(a)pyrene. These emissions cause smog at low levels and can rise into the atmosphere and contribute to the greenhouse effect.

coarse *adjective* (particle or grain of sand) which is larger than others; *coarse sand fell to the bottom of the liquid as sediment, while the fine grains remained suspended*

coast *noun* land along by the sea

◇ **coastal** *adjective* by the sea; *a plant found in coastal waters*; **coastal fog** *n* fog which forms in coastal areas, caused by cold air from the land meeting warmer water; **coastal protection** *n* protecting the coast from being eroded by the action of the sea

◇ **coastline** *noun* the outline of a coast

cobalt *noun* metallic element, used to make alloys; **cobalt-60** *n* radioactive isotope which is used in radiotherapy to treat cancer

NOTE: symbol is Co; atomic number is 27

cobble *noun* large round stone; *see also* WENTWORTH-UDEN SCALE

coccidioidomycosis *noun* lung disease caused by inhaling spores of the fungus *Coccidioides immitis*

coconut *noun* harkness shaped like a ball with plant in *coconut*

COMMENT: coconuts grow together in groups, either in thorns (staghoes) or in long chains (stringers)

coconut *noun* tropical palm tree with a large hard fruit containing a white edible pulp; the outer husk is used to make a rough fibre called coir

COO = CHEMICAL OXYGEN DEMAND

code 1 *noun* sign which have a hidden meaning; **genetic code** *n* characteristics which exist in the DNA of a cell and are inherited by an offspring; **2** *noun* to give a meaning; *genes are sequences of DNA that code for specific proteins*

codification *noun* process by which molecules of toxic substances can be evaporated into clouds over land and then fall back into the sea as rain

cod liver oil *noun* oil from the liver of codfish, which is rich in calories and vitamins A and D

codominant *noun & adjective* (species) which is dominant with another species

-coele *suffix* referring to a hollow

coeli - I.S. **coeli** - *prefix* referring to a hollow, usually the abdomen

◇ **coeliac** *adjective* referring to the abdomen

coelom *noun* body cavity in an embryo, which divides to form the thorax and abdomen

coir *noun* rough fibre from the outer husk of coconuts

coke *noun* fuel manufactured by heating coal to high temperatures without the presence of air

COMMENT: coke is produced in coking ovens, where coal is heated to white heat without air. This removes most of the tar and the resulting fuel burns at a much higher temperature than coal and produces very little smoke or ash. It is used in blast furnaces.

col *noun* (i) high pass between two mountains; (ii) low pressure area between two anticyclones

cold 1 *adjective* not warm or not hot; the weather is colder than last week and they say it will be even colder tomorrow; many old people suffer from hypothermia in very cold weather; cold bone = the edge of an advancing team of cold are associated with an area of low pressure, bringing clouds and rain as it moves; the pressure at which it displaces; cold hardening = the process by which a metal prepares for the winter by reducing the amount of water contained in its molecules; cold enough = long area of low pressure with cold air in it, leading away from a depression 2 *noun* cold weather; sleep one without the cold

coldform *adjective* (chemical) which are similar to *E. coli*

CONCISE: if *Escherichia coli* is found in water, it indicates that the water has been polluted by faeces, although it may not cause any illness

collagen *noun* bundles of protein fibres, which form the connective tissue, bone and cartilage; collagen disease = any of several diseases of the connective tissue

1 *collagenous* *adjective* (a) containing collagen; (a) referring to collagen disease

CONCISE: collagen disease includes rheumatic fever and rheumatoid arthritis. Collagen disease can be treated with cortisone

colloid *noun* substance with very small particles, which form a solution when in suspension in a liquid

1 *colloidal* *adjective* (very fine particles which does not settle but remains in suspension in a liquid)

2 *colloidally* *adverb* : *colloidally* dispersed particles = particles which remain in suspension in a liquid

colony *noun* group of animals or plants or microorganisms living together in a certain place; a colony of ants

1 *colonial* *adjective* referring to a colony; colonial animals = animals (such as ants or some snails or polyps) which usually live in colonies

2 *colonization* *noun* act of colonizing a place; islands are particularly subject to colonization by species of plants or animals introduced by man

3 *colonize* *verb* to begin to live in a place (as a group); densities city sites rapidly become colonized by plants; rats have colonized the river banks

4 *colonizer* *noun* animal or plant which colonizes an area

Colorado beetle *noun* beetle with black and yellow stripes which eats and destroys potato plants

coloration *noun* the colour or pattern of an animal; cryptic coloration = pattern of coloring which makes an animal less easy to see (such as the stripes on a zebra)

colostrum *noun* fluid secreted by an animal's mammary glands at the birth of young and before the real milk starts to flow

colour = *US color* 1 *noun* following wavelengths of light (red or blue or yellow, etc.) that are reflected from objects and viewed by the eyes; flowers are colour in attract insects 2 *verb* to give colour to; the chemical coloured the water blue

1 *colouring* (verb) *noun* substance which colours a processed food

2 *colourless* *adjective* with no colour; water is a colourless liquid

CONCISE: colouring additives have 5 numbers (40 to 499) before an optional pigment, such as chlorophyll (C 140), carotene (C 141) or chlorophyll (C 142) and are safe. Others, such as tartrazine (E 102) and others are listed as suspended of being carcinogenic. Also present in natural (E 103) which is the most widely used colouring substance

column *noun* usually circular mass standing upright like a tree; basalt rocks form columns in certain parts of the world

1 *columnar* *adjective* shaped like a column; igneous rocks may have a columnar structure

combat *verb* to fight against; the medical team is conducting an outbreak of dysentery; what can we do to combat the spread of the disease?

combine *verb* to join together; combined heat and power (CHP) scheme = scheme to produce electric power and hot water by burning waste

1 *combination* *noun* act of joining together

combust *verb* to burn; Denmark combust 75% of its refuse for heat reclamation

1 *combustion* *noun* burning of a substance with oxygen; internal combustion engine = engine used in motor vehicles in which petrol is burnt with oxygen under pressure forcing pistons to move

commensal *noun* & *adjective* (plant or animal) which lives on another plant or animal but does not harm it or influence it in any way; though one of the two may benefit from the other

NOTE: if it causes harm it is a **parasite**; if the two organisms are dependent on each other they exist in **symbiosis**

◇ **commensalism** *noun* existing together as commensals

comminutor *noun* crushing machine which reduces particles to a smaller size, as in the first treatment given to raw sewage, where the sewage is ground into small particles

COMMENT: some plants grow better when planted near others. Beans and peas help root plants such as carrots and beetroot. Most herbs (except fennel) are helpful to other plants. Marigolds help reduce aphids if they are planted near plants such as broad beans or roses which are subject to aphid infestation. The strong smell of onions is disliked by the carrot fly, so planting onions near carrots makes sense. On the other hand, most other plants (and especially peas and beans) dislike onions and will not grow well near them

compartment *noun* section of a managed plantation of trees

compensation *noun* **compensation depth** = point in a lake or sea at which the rate of creation of organic matter by photosynthesis is the same as the rate of loss of matter by respiration; **compensation point** = point at which the rate of creation of organic matter in photosynthesis is the same as the rate of loss of matter by respiration (i.e. the point at which carbon dioxide used by plants equals the oxygen they release)

comply with *verb* to obey (a regulation); *the factory was forced to comply with the new regulations on emission of toxic gases*

◇ **compliance** *noun* act of obeying a regulation

QUOTE some cities have tried to bring their ozone levels into compliance with federal safety standards, but failed

Environmental Action

compose *verb* to make up; *air is composed of a mixture of gases: 75% nitrogen, 23% oxygen, 1% argon and very small quantities of several other gases*

◇ **composition** *noun* way in which a compound is formed; **chemical composition** = the chemicals which make up a substance

Compositae *noun* common and very large family of plants, where the flowers are made of many florets arranged in heads (as in dandelions)

compost *noun* (a) rotted vegetation, used as fertilizer; **compost heap** = pile of rotting vegetation in a garden, which when fully rotted can be spread on the soil as a fertilizer or mulch (b) prepared soil or peat mixture in which plants are grown in horticulture; **mushroom compost** = special growing medium for commercial production of mushrooms

◇ **composting** *noun* action of encouraging the breaking down of organic waste, as in a compost heap

common 1 *noun* land on which anyone can walk, and may have the right to keep animals, pick wood, etc. (NOTE: now usually used in place names such as **Clapham Common**) **2** *adjective* (a) which happens very often; *noise pollution is a common problem in large cities* (b) referring to or belonging to several different people or to everyone; *(in the EEC) Common Agricultural Policy (CAP) = agreement between members of the EEC to protect farmers by paying subsidies to fix prices of farm produce*; **common land** = land on which anyone can walk and may have the right to keep animals, pick wood, etc.; **common nuisance** = criminal act which causes harm or danger to members of the public in general or to their rights

community *noun* (a) group of different organisms which live together in an area, and which are usually dependent on each other for existence; **climax community** = plant community which has been stable for many years and which is unlikely to change unless the climate changes or there is human interference (b) group of people who live and work in a district; *the health services serve the local community*; *community care is an important part of primary health care*; **community architecture** = way of designing new housing projects or adapting old buildings, in which the people living in the area as well as specialists are involved in the planning; **community heating** = heating of houses and shops in an area from a central source; **community medicine** = medical practice which examines groups of people and the health of the community, including housing, pollution and other environmental factors; **community physician** = doctor who specializes in community medicine; **community services** = nursing services which are available to the community

companion *noun* person who goes with another; **companion plants** = (i) plants which grow best with other plants; (ii) plants which are grown with others by horticulturists because they encourage growth or because they reduce pest infestation

compound *noun* substance formed of two or more chemical elements

COMMENT: compounds are stable (i.e. the proportions of the elements in them are always the same) but can be split into their basic elements by chemical reactions

concentrate *noun* (a) strength of a solution; quantity of a substance in a certain volume (b) strong solution which is to be diluted 2 *verb* (a) to concentrate on = to examine something in particular (b) to reduce a solution and increase its strength by evaporation

◇ **concentration** *noun* amount of a substance in a solution or in a certain volume

QUOTE the concentration of atmospheric carbon dioxide is now 23 per cent higher
Scientific American

QUOTE flights into the Antarctic ozone hole revealed very high concentrations of chlorine monoxide

New Scientist

concrete *noun* hard stone-like substance made by mixing cement, sand and water and letting it dry; **reinforced concrete** = blocks of concrete with steel rods inside to give extra strength, used in the construction of large buildings

◇ **concretion** *noun* formation of a solid mass of stone, made of pieces of stones and other sedimentary materials

condense *verb* (a) (i) to make a vapour become liquid; (ii) (of a vapour) to become liquid (b) to make compact or to make more dense

◇ **condensation** *noun* (a) action of condensing vapour into liquid; **condensation aerosol** = droplets of moisture which form in the air (as a mist); **condensation nucleus** = particle on which moisture condenses, forming a raindrop (b) water which forms on walls or windows, etc. when warm damp air meets a cold surface

◇ **condensed** *adjective* made compact or more dense

◇ **condenser** *noun* device which cools steam from a power station, converts it back into water, which is then sent back to the boilers for reheating

COMMENT: condensers are also used in domestic clothes driers (where the warm air is recycled through the machine and is used again to save energy), and in refrigerators (where heat is transferred to the cooling liquid)

condition *noun* state (of health or of cleanliness); *the road system is in very good condition; half the population is suffering from malnutrition and their condition is getting*

worse; conditions in the urban areas are very bad

◇ **conditioned reflex** *noun* automatic reaction by an animal to a stimulus; a normal reaction to a normal stimulus learned from past experience

conduction *noun* passing of heat or sound from one part to another; **air conduction** = conduction of sounds from the outside to the inner ear through the auditory meatus; **bone conduction** or **osteophony** = conduction of sound waves to the inner ear through the bones of the skull

◇ **conductive** *adjective* referring to conduction

conduit *noun* channel or passage along which a fluid flows

cone *noun* (a) circular shape like a tube with a wide bottom, narrowing to a point (b) one of two types of cell in the retina of the eye which is sensitive to light (cones are sensitive to bright light and colours and do not function in bad light) (c) hard case containing the seeds of a conifer

◇ **coning** *noun* effect of a plume of smoke from a chimney which widens into the shape of a cone as it leaves the chimney

confluence *noun* (i) place where two rivers join; (ii) place where two streams of air join

congenital *adjective* which exists at or before birth; **congenital defect** = defect which exists in a baby from birth

COMMENT: a congenital condition is not always inherited from a parent through the genes. It may be due to abnormalities which develop in the fetus because of factors such as a disease which the mother has (as in the case of German measles) or a drug which she has taken

◇ **congenitally** *adverb* existing at or before birth; *she was born congenitally deaf*

congestion *noun* blocking of a tube or a passage; **traffic congestion** = blocking of the streets in a town by traffic

◇ **congested** *adjective* blocked (passage); *it is hoped that building the by-pass will relieve the congested inner city streets*

conglomerate *noun* sedimentary layer formed of small round stones

conifer *noun* evergreen tree with long thin leaves (called needles) and which produces fruit in the form of cones; *afforestation with conifers has had a noticeable effect on the landscape of the upland region*

◇ **coniferous** *adjective* (tree) which has cones

COMMENT: Conifers are members of the order Coniferales, and include pines, firs, spruce, etc. They are natives of the cooler temperate regions, are softwoods and grow very fast. They exude resin, and this, together with the hardness of the needles makes it impossible for plants to grow on the forest floor beneath them. If conifers are planted close together they will grow straight and tall, making them ideal for cheap construction material. Because of this, they are frequently used in afforestation plantations in places where they would not have grown naturally, and where, unfortunately, they hide the landscape and reduce wildlife

connect *verb* to join; *a sandbar connects the island to the mainland at high tide*

◇ **connection** *noun* something which joins

◇ **connective tissue** *noun* tissue which forms the main part of bones and cartilage, ligaments and tendons, in which a large proportion of fibrous material surrounds the tissue cells

conserve *verb* to keep or not to waste

◇ **conservancy** *noun* official body which protects a part of the environment, such as a river; **Nature Conservancy Council** = official body in the UK responsible for conservation of fauna and flora

◇ **conservation** *noun* (a) keeping or not wasting; **conservation of energy** = making consumption of energy more efficient; preventing loss or waste of energy (such as the loss of heat from buildings); **conservation of soil** or **soil conservation** = preventing soil from being eroded or over-cultivated (by irrigation, mulching, etc.) (b) maintenance of environmental quality or resources by the use of ecological knowledge and principles; **nature conservation** = preserving nature as it is at present, and taking steps to make sure that it is not polluted or disturbed

◇ **Conservation Area** *noun* area of a town where the buildings are of special architectural and historical interest

◇ **conservationist** *noun* person who promotes the preservation of the countryside and the careful management of natural resources

QUOTE the genus *Martes* comprises eight species, all of which have solved the problem of conserving heat in the long northern winters by growing dense water-repellent coats

BBC Wildlife

QUOTE if all cost-effective conservation measures were taken and the U.S. became as energy-efficient as Japan, the country would consume half as much energy as it does today

Scientific American

constant *adjective* (a) continuous or not stopping; *the wardens complained about the constant stream of visitors to the reservation* (b) level or unchanging; *rainfall remains fairly constant throughout the year*; **constant level chart** = chart showing the isobars of a certain pressure at a certain level in the upper atmosphere; **constant pressure chart** = chart showing the different heights at which a pressure reading is obtained

consume *verb* to use up or to burn (fuel) or to eat (foodstuffs); *the population consumes ten tonnes of foodstuffs per week*; *the new pump consumes only half the fuel which a normal pump would use*

◇ **consumable** *adjective* consumable goods = goods which are bought by members of the public

◇ **consumables** *plural noun* = CONSUMABLE GOODS

◇ **consumer** *noun* (a) person or company which buys and uses goods and services; *gas consumers are protesting at the increase in prices*; *the factory is a heavy consumer of water*; **consumer council** = group representing the interests of consumers; **consumer durables** = items such as washing machines or refrigerators or cookers which are bought and used by the public; **consumer goods** = goods bought by consumers or by members of the public; **consumer panel** = group of consumers who report on products they have used so that the manufacturers can improve them or use what the panel says about them in advertising; **U.S. consumer price index** = index showing how prices of consumer goods have risen over a period of time, used as a way of measuring inflation and the cost of living; **consumer protection** = protecting consumers against unfair or illegal traders; **consumer research** = research into why consumers buy goods and what goods they really want to buy; **consumer society** = type of society where consumers are encouraged to buy goods (b) organism (such as an animal) which eats other organisms; **primary consumer** = animal (such as a herbivore) which eats plants (which are producers in the food chain); **secondary consumer** = animal (such as a carnivore) which eats other consumers in the food chain; **tertiary consumer** = carnivore which eats other carnivores

◇ **consumerism** *noun* movement for the protection of the rights of consumers; **green consumerism** = movement to encourage people to buy food and other products which are environmentally good (such as organic foods, lead-free petrol, etc.)

QUOTE the buildings sector, rather than transportation, is the single largest consumer of energy in the U.S. economy

Scientific American

consumption *noun* using a fuel or using goods or services; taking food or liquid into the

body; a car with low petrol consumption; the factory has a heavy consumption of coal; the country's consumption of wood has fallen by a quarter; 3% of all food samples were found to be unfit for human consumption through contamination by lead; home consumption or domestic consumption = use of something in the home; consumption residues = waste matter formed after manufactured goods are used

contact 1 *noun* touching someone or something; to have contact with someone or something = actually to touch someone or something; to be in contact with someone = to be near someone or to touch someone; **contact herbicide** or **contact weedkiller** = substance (such as paraquat) which kills the plants that it touches; **contact insecticide** = substance (such as DDT) which kills insects which touch it, used against insects such as mosquitoes 2 *verb* to meet or to get in touch with someone; *contact your local office to find out details of membership of the group*

contagion *noun* spreading of a disease by touching an infected person or objects which an infected person has touched

◇ **contagious** *adjective* (disease) which can be transmitted by touching an infected person or objects which an infected person has touched

contaminate *verb* to make something impure by touching it or by adding something to it; *supplies of drinking water were contaminated by refuse from the factories; a whole group of tourists fell ill after eating contaminated food; 7% of the soil is contaminated with heavy metals*

◇ **contaminant** *noun* substance which contaminates

◇ **contamination** *noun* (a) action of contaminating; *the contamination resulted from drinking polluted water* (b) state of something (such as water or food) which has been contaminated and so is harmful to humans

content *noun* proportion of a substance in something; *these foods have a high starch content; dried fruit has a higher sugar content than fresh fruit*

continent *noun* one of the seven large landmasses on the earth's surface (Asia, Africa, North America, South America, Australia, Europe and Antarctica)

◇ **continental** *adjective* referring to a continent; **continental climate** = type of climate found in the centre of continents away from the sea, with long dry summers, very cold winters and not much precipitation; **continental crust** = part of the earth's crust under the continents and continental shelves, lying above the oceanic crust; **continental drift** = geological theory that the present

continents were once part of a single land mass and have gradually drifted away from each other over a period of millions of years; **continental margin** = area of sea and seabed around a continent, extending to a depth of about 2,000m; **continental shelf** = area of shallow sea surrounding a continent (usually taken to be the area between the shore and the 183m deep line); **continental slope** = area of the seabed which slopes down sharply from the edge of the continental shelf into deeper water

contour *noun* line drawn on a map to show ground of the same height above sea-level; **contour interval** = the space between two contour lines on a map; **contour map** = map showing the contours of a geographical area; **contour farming** = method of cultivating sloping land, where the land is ploughed along a level, rather than down the slope, so reducing erosion; **contour ridging** = ploughing across the side of a hill so as to create ridges along the contours of the soil which will hold water and prevent erosion; **contour strip cropping** = planting different crops in bands along the contours of sloping land so as to prevent soil erosion

COMMENT: in contour farming, the ridges of earth act as barriers to prevent soil being washed away and the furrows retain the rainwater

control 1 *noun* (a) restraining or keeping in order; the specialists brought the epidemic under control = they stopped it from spreading; the epidemic rapidly got out of control = it spread quickly (b) (in experiments) sample used as a comparison with the one being tested; **control group** = group of substances which are not being tested, but whose test data is used as a comparison 2 *verb* to keep in order; the medical authorities are trying to control the epidemic; they were unable to control the spread of the pest; **controlled drugs** or **dangerous drugs** = drugs which are on the official list of drugs which are harmful and are not available to the public; **controlled tipping** = disposal of waste in special landfill sites as opposed to throwing it away anywhere
NOTE: the US English is **sanitary landfill**

conurbation *noun* large area covered with buildings (houses or factories or public buildings, etc.)

convection *noun* vertical movement of air; compare **ADVECTION**

conventional *adjective* normal or traditional; not using new technologies; not using nuclear power; **conventional power station** = non-nuclear power station; **conventional medicine** = medical practice as taught in hospitals and medical schools (as opposed to alternative medicine)

convert *verb* to change to something different; *photochemical reactions convert oxygen to ozone*; he has converted his car to take unleaded petrol; sulphur dioxide and nitrogen oxides emitted into the atmosphere are chemically converted into sulphuric and nitric acid

◇ **conversion** *noun* act of converting; the conversion of oxygen into ozone

◇ **converter** *noun* device or process which converts; **Bessemer converter** = type of furnace in which air is blown through molten metal; **catalytic converter** = device attached to the exhaust pipe of a car which reduces the emission of carbon monoxide; **methane converter** = process which takes the gas produced by rotting waste in a landfill site and processes it into a usable form

COMMENT: a catalytic converter is a box filled with a catalyst, such as platinum. Converters can only be used on cars burning unleaded petrol, as the lead compounds in leaded petrol rapidly coat the catalyst in the converter and prevent it functioning

cool 1 not very hot; *cool weather is forecast for the rest of the week* 2 *verb* to make less hot; to become less hot; **cooling pond** = (i) part of a nuclear reactor where irradiated elements are cooled; (ii) part of an industrial process where cooling water is allowed to cool in the open air; **cooling tower** = tall tower used for cooling the water used in industrial processes, such as at power stations

◇ **coolant** *noun* (a) substance used to cool something (b) substance used to take the heat generated from a nuclear power station to the boilers; *ordinary water is used as coolant in certain types of nuclear reactor*

copper *noun* metallic trace element, essential to biological life and used in making alloys and in electric wiring

NOTE: the chemical symbol is **Cu**; atomic number is 29

coppice 1 *noun* area of trees which have been cut down to the ground to allow shoots to grow which are then harvested 2 *verb* to cut trees down to near the ground to produce strong straight shoots which are then harvested; *coppicing is a traditional method of wood management; coppiced wood can be dried for use in wood-burning stoves; compare POLLARD*

COMMENT: the best trees for coppicing are those which naturally send up several tall straight stems from a bole, such as willow, alder or poplar. In coppice management, the normal cycle is about five to ten years of growth, after which the stems are cut back. Thick stems are dried and used as fuel, or for making charcoal. Thin stems are used for fencing

copra *noun* dried pulp of a coconut, from which oil is extracted by pressing

coral *noun* rock-like substance composed of the skeletons of dead polyps; **coral reef** = reef formed of coral; **coral sand** = fine white particles which form tropical beaches, which is not sand at all but tiny pieces of dead coral

cordwood *noun* pieces of cut tree trunks, all of the same length, ready for transporting

core *noun* (a) central part of the earth; *the earth's core is believed to be formed of nickel and iron* (b) central part of a nuclear reactor, where the fuel rods are sited

Coriolis force *noun* phenomenon by which particles tend to move to the side as they travel forwards (bodies turn clockwise in the northern hemisphere and anti-clockwise in the southern)

cork *noun* layer of dead cells under the bark of a tree, especially the thick layer of this in the cork oak

corm *noun* bottom part of the stem of a plant which, like a bulb, can be preserved and from which the plant sprouts again in the spring

COMMENT: crocuses, gladioli and cyclamens have corms, not bulbs

corn *noun* (a) any cereal crop, but especially wheat (b) *US* maize

corolla *noun* ring of brightly coloured petals on a flower

corona *noun* rings of colour round the sun or moon when seen through thin mist

corrasion *noun* cutting by a river into rock or soil to form a valley or canyon

correction *noun* changing something to make it correct; **barometric corrections** = corrections made to the reading on a mercury thermometer to allow for altitude and outside temperature

corrode *verb* to change the composition of metals by exposure to water or air; *iron corrodes and forms rust*

◇ **corrosion** *noun* (i) changing of metals by exposure to water or air; (ii) erosion of rocks by the action of chemicals

◇ **corrosive** *adjective* (substance) which corrodes; *corrosive dry deposition can affect building materials*

cosmos *noun* the whole universe

◇ **cosmic adjective** referring to the cosmos; **cosmic rays** or **cosmic radiation** = radiation coming from outer space which strikes the earth

cost-benefit analysis *noun* examination in economic terms of the advantages and disadvantages of a certain course of action; **cost-benefit ratio** = comparison of costs to benefits

◇ **cost-effective adjective** which gives value, especially in comparison with something else, when the benefit is greater in value compared with the cost

◇ **cost-effectiveness** *noun* measurement of how cost-effective something is

cottonwood *noun* North American hardwood tree

cotyledon *noun* first leaf of a plant as a seed sprouts

COMMENT: cotyledons are thicker than normal leaves, and contain food for the growing plant. Plants are divided into two groups: those which produce a single cotyledon (monocotyledons) and those which produce two cotyledons (dicotyledons)

counter *noun* instrument which measures something and shows the result on a dial; **Geiger counter** = instrument for the detection and measurement of radiation

countershading *noun* type of animal coloration where the back is darker than the belly, making it more difficult to see the animal's shape clearly

country *noun* area of land which is not a town or city; *we live in the country*; **country areas** are less polluted than urban areas; **country park** = area of land in the country with special facilities for the public

◇ **countryside** *noun* the land excluding towns and cities; **Countryside Commission** = official organization in the UK which supervises the planning of the countryside and how it can be used for the enjoyment of the population

coupe *noun* area of a forest in which trees have been cut

cover *noun* (i) something which is put over something to close it or protect it; (ii) amount of soil surface covered with plants; (iii) plants grown to cover the surface of the soil; *grass cover will provide some protection against soil erosion*; **ground cover** = plants which cover the soil; **cover crops** = crops which are sown to cover the soil and prevent it from drying out

Cr symbol for chromium

cracking *noun* process by which crude oil is broken down into light oil

crater *noun* round depression at the top of a volcano; **crater lake** = round lake which forms in a crater

creosote *noun* liquid derived from coal tar, used as a pesticide or to paint timber to preserve it from rot or to prevent attacks by insects

crepuscular rays *noun* separate vertical rays of sunlight which pass through gaps in clouds

crest *noun* highest point along the length of a mountain ridge

crevasse *noun* large crack in a glacier

crevice *noun* crack or little hole in rock

crisis *noun* (a) important point or time when things are in a very bad state; *a crisis caused by drought* (b) turning point in a disease after which the patient may start to become better or very much worse NOTE: plural is **crises**

criterion *noun* standard by which something can be judged
NOTE: plural is **criteria**

critical adjective (a) referring to crisis; **critical link** = organism in a food chain which is responsible for taking up and using nutrients; **critical load** = highest level of pollution which will not cause permanent harm to the environment; **critical mass** = minimum amount of fissile matter which can produce a chain reaction; **critical organ** = part of the body which is particularly sensitive to radiation; **critical temperature** = temperature below which a gas will normally become liquid (b) which criticizes; *the report was critical of the steps taken to cut down pollution*

◇ **critically** *adverb* in a way which criticizes; **critically ill** = very seriously ill when it is not known if the patient will get better

criticize *verb* to say what is wrong with something; *the report criticized the government's attitude to building on green belt areas*

crop 1 *noun* (a) plants grown for food; *crop breeders depend on wild plants to develop new and stronger strains*; **rotation of crops** or **crop rotation** = system of cultivation where different crops are planted in three consecutive growing seasons to prevent the nutrients in the soil being totally used up (each plant uses different nutrients), and the land is allowed to lie fallow for the fourth year (b) produce from plants; *the tree has produced a*

heavy crop of apples; the first crop was a failure
(c) bag-shaped part of a bird's throat where food is stored before digestion **2 verb** (of plants) to produce fruit; **a strain of rice which crops heavily**

◇ **cropland** *noun* agricultural land which is used for growing crops

◇ **cropper** *noun* heavy cropper = tree or plant which produces a large crop of fruit

cross 1 noun (a) shape made with an upright line with another going across it, used as a sign of the Christian church; the Red Cross = international organization which provides emergency medical help (b) breeding of plants or animals from two different breeds or varieties; plant or animal bred from two different breeds; **a cross between two strains of cattle** **2 verb** to breed a plant or animal from two different breeds; **they crossed two strains of rice to produce a new strain which is highly resistant to disease**

◇ **crossbred** *adjective* (animal) which is the result of breeding from two breeds; **a herd of crossbred sheep**

◇ **cross-breeding** *noun* breeding of animals where a female is impregnated with semen from a male of another breed

◇ **cross-fertilization** *noun* fertilizing one individual plant from another of the same species

◇ **cross-pollination** *noun* pollinating a plant with pollen from another plant of the same species (the pollen goes from the anther of one plant to the stigma of another)

COMMENT: all of these processes avoid inbreeding, which may weaken the species. Some plants are self-fertile (i.e. they are able to fertilize themselves) and do not need pollinators, but most benefit from cross-fertilization and cross-pollination

crown *noun* top part of a tree where the main growing point is; **the disease first affects the lower branches, leaving the crowns still growing**

◇ **crown of thorns starfish** *noun* type of large starfish which lives on coral and destroys reefs

Cruciferae *noun* family of common plants (such as the cabbage) whose flowers have four petals

crude oil or crude petroleum *noun* petroleum that is extracted from the earth and before it is processed into petrol and other products

COMMENT: crude petroleum is found in geological deposits, mainly in the Middle East, in the North Sea, Central America and Asia. It is made up of varying types of hydrocarbon, together with sulphur compounds and is often found with natural gas

crust *noun* hard top layer, especially the top layer of the surface of the earth, which is formed of rock and lies above the asthenosphere; **continental crust** = part of the earth's crust under the continents and continental shelves, lying above the oceanic crust

Crustacea *noun* class of animals (such as crabs or lobsters) which have hard shells which are shed periodically as the animals grow

◇ **crustacean** *noun* crab or lobster or shrimp, etc.

cryophyte *noun* plant which lives in cold conditions (as for example in snow)

cryptic coloration *noun* pattern of colouring which makes an animal less easy to see (such as the stripes on a zebra)

◇ **crypto-** *prefix* meaning hidden

◇ **cryptozoic** *adjective* (animal) which lives hidden in holes in rocks or trees

crystal *noun* regular shape formed by an element or compound when it becomes solid

◇ **crystalline** *adjective* (rock) formed of crystals

Cs *symbol for caesium*

CSF = CEREBROSPINAL FLUID

Cu *symbol for copper*

cull 1 noun killing a certain number of living animals to keep the population under control; **deer cull or seal cull** = killing a certain number of deer or seals **2 verb** to kill a certain number of animals in order to keep the population under control

QUOTE introducing superior quality genotypes into the population can only improve the entire breed if inferior ones are culled

Appropriate Technology

QUOTE the director of the fishermen's federation continues to call for a grey seal cull (he wants up to 15,000 killed each year)

BBC Wildlife

COMMENT: in the management of large wild animals without predators, such as herds of deer in Europe, it is usual to kill some mature animals each year to prevent a large population forming and overgrazing the pasture. Without culling the population would seriously damage their environment and eventually die back from starvation

cullet *noun* broken glass (collected for recycling)

culm *noun* (a) stem of a grass which produces flowers (b) type of waste from an anthracite processing plant

cultch *noun* waste material placed in the sea to act as a breeding ground for oysters

cultivate *verb* (i) to grow crops; (ii) to dig and manure the soil ready for growing crops; *the fields are cultivated in the spring, ready for sowing corn*; **cultivated land** = land which has been dug or manured for growing crops

◇ **cultivar** *noun* variety of a plant which has been developed under cultivation and which does not occur naturally in the wild, but which is a distinct sub-species

◇ **cultivation** *noun* action of cultivating land; **land under cultivation** = land which is being cultivated or which has crops growing on it; *the area under rice cultivation has grown steadily in the past 40 - 50 years*; **shifting cultivation** = form of cultivation practised in some tropical countries, where land is cultivated until it is exhausted and then left as the farmers move on to another area

◇ **cultivator** *noun* (a) person who cultivates land (b) instrument or small machine for cultivating small areas of land

culture 1 *noun* bacteria or tissues grown in a laboratory; **culture medium** or **agar** = liquid or gel used to grow bacteria or tissue; **stock culture** = basic culture of bacteria from which other cultures can be taken 2 *verb* to grow bacteria in a culture medium

culvert *noun* covered drain for waste water

cumulus *noun* big fluffy white clouds which form at a low altitude (below 2,000m) as single clouds in warm summer weather, becoming eventually unbroken sheets of grey cloud (also called altocumulus or stratocumulus depending on the altitude); *see also* ALTOCUMULUS, STRATOCUMULUS

◇ **cumulonimbus** *noun* dark low cumulus cloud whose top rises very high and produces rain from its lower part

curie *noun* former unit of measurement of radioactivity, now replaced by the becquerel; *discharges of more than 20 curies per year are not permitted* NOTE: with figures usually written Ci: 25Ci

current *noun* flow (of water or air or electricity); *dangerous currents make fishing difficult near the coast*; *a warm westerly current of air is blowing across the country*

curvature *noun* way in which something bends from a straight line; **curvature of the earth** = where the horizon curves visibly (seen most clearly at sea)

cut 1 *noun* act of cutting down trees; **partial cut** = method of foresting where only some trees are cut, leaving others standing to seed the area which has been left clear by cutting; *see also* CLEARCUT 2 *verb* to remove trees with a saw or other sharp tool

◇ **cutting** *noun* small piece of a plant used for propagation; **leaf cutting** or **root cutting** or **stem cutting** = piece of a leaf or root or stem cut from a living plant and put in soil where it will sprout

COMMENT: taking cuttings is a frequently used method of propagation which ensures that the new plant is an exact clone of the one from which the cutting was taken

cyan *noun* primary blue colour

cyanide *noun* any salt of hydrocyanic acid

COMMENT: hydrogen cyanide is a gas with a smell of almonds; it kills very rapidly when drunk or inhaled. Cyanide is present in many effluents from industrial processes

ciano- *prefix* blue

◇ **cyanocobalamin** *noun* vitamin B₁₂

COMMENT: Vitamin B₁₂ is found in liver and kidney but not in vegetables. Lack of it can cause anaemia

Cyanophyta *noun* blue-green algae, usually found in fresh water, which store starch in the form of glycogen

cyanosis *noun* blue colour of the skin and mucous membranes, symptom of lack of oxygen in the blood (as in a blue baby)

cyclamate *noun* sweetening substance (a salt of cyclamic acid) believed to be carcinogenic and banned in the USA as a food additive

cycle *noun* series of events which recur regularly; *industrial waste upsets the natural nutrient cycle*; **carbon cycle** or **circulation of carbon** = carbon atoms from carbon dioxide are incorporated into organic compounds in plants during photosynthesis. They are then oxidized into carbon dioxide again during respiration by the plants or by herbivores which eat them and by carnivores which eat the herbivores, thus releasing carbon to go round the cycle again; **hydrological cycle** = cycle of events when water in the sea evaporates, forms clouds which deposit rain as they pass over land, the rain then drains into rivers which return the water to the sea; **menstrual cycle** = period (usually 28 days) during which the endometrium develops, a woman ovulates, and menstruation takes place; **nitrogen cycle** = process by which nitrogen enters living organisms (the nitrogen

is absorbed into green plants in the form of nitrates, the plants are then eaten by animals, and the nitrates are returned to the ecosystem through the animal's excreta or when an animal or a plant dies)

◇ **cyclical** *adjective* referring to cycles

cyclo- *prefix* meaning cyclical or referring to cycles

cyclone *noun* (a) any area of low pressure around which the air turns in the same direction as the earth; *see also* ANTICYCLONE (b) (in the Indian Ocean) **tropical cyclone** = tropical storm with masses of air turning rapidly round a low pressure area (c) device which removes solid particles from waste gases produced during industrial processes

◇ **cyclonic** *adjective* referring to a cyclone; in a cyclonic direction = flowing in the same direction as the rotation of the earth

◇ **cyclonically** *adverb* in a cyclonic direction; *waterspouts rotate cyclonically, that is anticlockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere*

cyt- or **cyto-** *prefix* referring to cells

◇ **cytochemistry** *noun* study of the chemical activity of living cells

◇ **cytogenetics** *noun* branch of genetics which studies the structure and function of cells, especially the chromosomes

◇ **cytokinesis** *noun* changes in the cytoplasm of a cell during cell division

◇ **cytology** *noun* study of the structure and function of cells

◇ **cytolysis** *noun* breaking down of cells

◇ **cytoplasm** *noun* jelly-like substance inside the cell membrane which surrounds the nucleus of a cell

◇ **cytoplasmic** *adjective* referring to the cytoplasm of a cell

◇ **cytosine** *noun* one of the nitrogenous bases of DNA

◇ **cytosome** *noun* general term for a number of bodies in a cell

◇ **cytotoxin** *noun* substance which has a toxic effect on cells of certain organs

Dd

D *chemical symbol for deuterium*

Vitamin D *noun* vitamin which is soluble in fat and found in butter, eggs and fish (especially cod liver oil); it is also produced by the skin when exposed to sunlight

COMMENT: Vitamin D helps in the formation of bones and lack of it causes rickets in children

dairy farming *noun* rearing cows for milk production

dam *noun* construction built to block a river

COMMENT: dams are constructed either to channel the flow of water into hydroelectric power stations or to regulate the water supply to irrigation schemes. Dams can have serious environmental effects: the large heavy mass of water in the lake behind the dam may trigger earth movements if the rock beneath is unstable, in tropical areas, dams encourage the spread of bacteria, insects and parasites, leading to an increase in diseases such as bilharziasis; they may increase salinity in watercourses; in arctic areas, the freezing of the large lake behind the dam may alter the whole climate of a region. A dam also retains silt which otherwise would be carried down the river and be deposited as fertile soil in the plain below. The silt also clogs the dam and in time may make it impossible to use the hydroelectric turbines

damp *adjective* slightly wet

◇ **dampen** *verb* to make something slightly wet

◇ **damping** *noun* closing down of a blast furnace by cutting off the air supply

◇ **damp off** *verb* (of seedlings) to die from a fungus which spreads in warm damp conditions and attacks the roots and lower stems

COMMENT: damping off is a common cause of loss of seedlings in greenhouses

Darwinism or **Darwinian theory** *noun* the theory of evolution, formulated by Charles Darwin, which states that species of organisms

arose by natural selection; *see also* NEO-DARWINISM; **Darwinian fitness** = a measure of reproductive success or the success of organisms at passing on their genes to subsequent generations

daughter cell *noun* one of the cells that develop by mitosis from a single parent cell

daylight *noun* light of the sun during the day

dB = DECIBEL

DDT = DICHLORODIPHENYLTRICHLOROETHANE

COMMENT: DDT is a highly toxic insecticide, which remains for a long time as a deposit in animal organisms. It gradually builds up in the food chain as smaller animals are eaten by larger ones, with the result that raptors (such as eagles and hawks) can be killed by the DDT which builds up in their systems from the bodies of smaller animals which they have eaten

deactivate *verb* to stop something being active

debacle *noun* breaking up of the ice on a large river as it melts in spring

debris *noun* rubbish or waste matter; **volcanic debris** from a volcano in eruption; **mounds of debris** left by open-cast mining; **debris flow** = landslide or mudslide of waste matter (as on a spoil heap)

NOTE: no plural

decay **1** *noun* (a) disintegration of dead organic matter; **wood is treated to resist decay** (b) gradual disintegration of the nucleus of radioactive matter; **decay heat** = heat produced in a nuclear reactor as a radioactive substance decays **2** *verb* (a) (of organic matter) to rot or to disintegrate (b) (of radioactive substances) to disintegrate

decibel (dB) *noun* degree of measurement of noise; **decibel A scale** or **dBA scale** = international scale of noise level

COMMENT: the range of audible sounds is measured in decibels, which are calculated by measuring the sound pressure level. Decibels are calculated on a logarithmic scale, each step in the scale is an increase of ten times the previous step. The scale is further refined according to an A, B, C system, the dBA being the most used because it is the hearing level of humans

deciduous *adjective* (a) (tree) which loses its leaves in winter; *deciduous woodlands grew up after the last ice age* (b) **deciduous teeth** = the first teeth of an animal, in humans called milk teeth, which are gradually replaced by permanent teeth

decimate *verb* to reduce severely; *overfishing has decimated the herring population in the North Sea*

decline 1 *noun* gradual reduction; *the decline in the number of cases of pollution is due to better policing of factory emissions; the population of the birds now seems to be on the decline; ecologists are working to diagnose forest decline in its early stages* 2 *verb* to become less; *the fish population declined sharply as the water became more acid*

QUOTE much of the decline in energy consumption is due to the more efficient use of energy in homes and offices

Scientific American

QUOTE the butterfly's alarming decline is probably the result of habitat reduction

Natural History

declination *noun* magnetic declination = angle of difference between the direction of the North Pole and the North Magnetic Pole

decompose *verb* (of organic material) to break down into simple chemical compounds

◇ **decomposer** *noun* organism (such as a fungus) which obtains its energy from decomposing matter in the ecosystem; animal (such as the earthworm) which helps the decomposition of organic matter

◇ **decomposition** *noun* action of decomposing organic matter

decontamination *noun* stopping the contamination of a place by removing whatever is contaminating it

deep ecology *noun* extreme form of ecological thinking whereby humans are considered as only one species among many in the environment and where the large numbers of humans are seen as harmful to the environment in which they live

deficiency *noun* lack of something essential; **deficiency disease** = disease of plants or

animals caused by the lack of an essential nutrient

◇ **deficient** *adjective* lacking something essential; *the soil is deficient in important nutrients; scrub plants are well adapted to this moisture-deficient habitat*

definitive host *noun* host on which a parasite settles permanently

defoliation *noun* removing leaves from plants

◇ **defoliant** *noun* type of herbicide which makes the leaves fall off plants

deforest *verb* to cut down forest trees for commercial purposes or to make arable land; *timber companies have helped to deforest the tropical regions; about 40,000 square miles are deforested each year*

◇ **deforestation** *noun* cutting down forest trees to make arable land

QUOTE the main reason for the drought and its severity is deforestation like that which has taken place in Ethiopia and Brazil. The destruction of the trees destroys the land's watersheds. The lack of trees also allows the fertile topsoil to blow away

Appropriate Technology

degas *verb* to remove gas from something (as removing gas from a borehole)

degrade *verb* (i) to reduce the quality of something; (ii) to make a chemical compound decompose into its elements; *the land has been degraded through overgrazing; ozone may worsen nutrient leaching by degrading the water-resistant coating on pine needles*

◇ **degradable** *adjective* (substance) which can be degraded; compare BIODEGRADABLE

◇ **degradation** *noun* (i) making worse; becoming worse; (ii) decomposition of a compound into its elements; *chemical degradation of the land can be caused by over-use of fertilizers and by pollutants from industrial processes; degradation of air = making clean air become polluted*

QUOTE it is possible to degrade the actinides to fission products with much shorter half-lives

New Scientist

degree *noun* (a) (in science) unit of measurement; *a circle has 360°; the temperature is only 20° Celsius* NOTE: the word **degree** is written ° after figures: 40°C: say: 'forty degrees Celsius' (b) level of how important or serious something is; *to a minor degree* = in a small way

dehiscence *verb* (of ripe seed pod or fruit) to burst open to release seeds

◇ **dehiscence** *noun* sudden bursting of a seed pod when it is ripe allowing the seeds to scatter

◇ **dehiscent** *adjective* (seed pod) which bursts open to allow the seeds to scatter

dehumidifier *noun* machine which removes the humidity from air, usually part of an air-conditioning system

dehydrate *verb* (a) to lose water; to make something lose water (b) to lose water from the body; *after two days without food or drink, he became severely dehydrated*

◇ **dehydration** *noun* (a) process of removing water from something; loss of water (b) loss of water from the body

COMMENT: water is more essential than food for an animal's survival

deinking *noun* removing the ink from waste newspaper to allow it to be recycled

deintensified farming *noun* farming which was formerly intensive, using chemical fertilizers to increase production, but has now become extensive

delta *noun* triangular piece of land at the mouth of a large river formed of silt carried by the river

◇ **deltaic deposits** *noun* deposits of silt in a delta

demand *noun* need for something; *they are building more power stations to satisfy the increasing demand for electricity; they calculate that demand will exceed supply within ten years; chemical oxygen demand* = amount of oxygen taken up by organic matter in water, used as a way of measuring the amount of organic matter in sewage

deme *noun* population of organisms in a small area

◇ **-deme** *suffix* meaning section of a plant population which has distinct characteristics

demersal *adjective* (fish) which lives on or near the seabed; *compare PELAGIC*

demography *noun* study of human populations and their development

◇ **demographic** *adjective* referring to demography; **demographic transition** = pattern of change of population growth from high birth and death rates to low birth and death rates

denature *verb* (i) to make something change its nature; (ii) to convert a protein into an amino acid; **denatured alcohol** = alcohol which has unpleasant additives which are

intended to make it unfit for human consumption

dendritic *adjective* with branches; **dendritic drainage** = system of drainage where smaller channels branch out from larger ones

◇ **dendrochronology** *noun* scientific method of finding the age of wood by the study of tree rings

◇ **dendroclimatology** *noun* study of climate over many centuries, as shown in tree rings

COMMENT: because tree rings vary in width depending on the weather during a certain year, it has been possible to show a pattern of yearly growth which applies to all wood from a certain region. This allows old structures to be dated even more accurately than with carbon-dating systems. It is also possible to chart past changes in climate in the same way (rings vary in thickness according to rainfall, etc.) allowing scientists to compare the climatic changes in various parts of the world over a very long period of time

dengue or breakbone fever *noun* tropical disease caused by an arbovirus, transmitted by mosquitoes, where the patient suffers a high fever, pains in the joints, headache and a rash

denitrification *noun* releasing nitrogen from nitrates in the soil by the action of bacteria

dense *adjective* thick or close together; *the animals live safely in dense tropical rainforest*

◇ **density** *noun* (i) mass of the volume of a substance; (ii) the numbers of species in a certain area; **density dependence** = situation where a population of a species is regulated by its density; **density dependent** = (population) which is controlled by its own size; **density independent** = (population) which is not controlled by its own size

denude *verb* to make bare; *the timber companies have denuded the mountains*

◇ **denudation** *noun* making land or rock bare by cutting down trees, so contributing to erosion

deoxyribonucleic acid (DNA) *noun* one of the nucleic acids, the basic genetic material present in the nucleus of each cell; *see also RNA*

department *noun* section of a government or government agency; *GB Department of the Environment (DoE)* = British government department concerned with the conditions in which people live, and also responsible for contacts between central government and certain aspects of local government; *US Department of Energy (DOE)* = US government department responsible for

controlling energy (nuclear power, gas, electricity, etc.)

dependent *adjective* which relies on something; *the country's whole economy is dependent on its natural resources*

deplete *verb* to remove a resource; *runoff from hillside depletes the soil of nutrients*

◇ **depletion** *noun* removing a resource from an area; *a study of atmospheric ozone depletion; production of ice crystals from methane can deplete ozone still further*

deposit 1 *noun* substance which has been laid down or has accumulated on something; *deposits of coal have been found in the north of the country* 2 *verb* to place something on; *the volcanic eruption deposited a thin layer of ash over a wide area*

◇ **deposition** *noun* action of depositing; *the deposition of sediment at the bottom of a lake; dry deposition* = falling of dry particles from polluted air (in the same way as acid rain falls) which form a harmful deposit on surfaces such as buildings or the leaves of trees; *some of the sulphate particles settle to the ground in the process called dry deposition*

◇ **depository** *noun* place where something is kept; storing of nuclear waste; *they carried out tests to establish the suitability of the rock formation as a waste depository; deep depository* = storage of nuclear waste in very deep holes in the ground; *compare REPOSITORY*

depression *noun* (a) cyclone or area of low atmospheric pressure usually accompanied by rain (b) area of low land surrounded by higher ground

derelict *adjective* (land) which is not used for anything; *a plan to reconstruct derelict inner city sites*

derris *noun* powdered insecticide extracted from the root of a tree

desalinate *verb* to remove salt from water

◇ **desalination** *noun* removing salt from a substance such as sea water; *desalination plant* = factory which takes sea water and removes the salt to produce fresh drinking water

COMMENT: desalination can refer simply to the removal of salts from soil by the action of rain. It is most commonly used to mean the process of removing salt from sea water to make it drinkable. Desalination plants work by distillation, dialysis or by freeze drying. The process is very costly, and is only cost-effective in desert countries where the supply of fresh water is minimal

desert *noun* area of land with very little rainfall, arid soil and little or no vegetation; *desert soil* = the soil in a desert (it is normally sandy with little organic matter); *biological desert* = area where there is no life (not necessarily on land, as heavy pollution of a lake can turn the bottom of the lake into a biological desert)

◇ **desertification** *noun* process of becoming a desert; *changes in the amount of sunlight reflected by different vegetation may contribute to desertification; increased tilling of the soil, together with long periods of drought have brought about the desertification of the area*

◇ **desertify** *verb* to make land into a desert; *it is predicted that half the country will be desertified by the end of the century*

COMMENT: a desert will be formed in areas where rainfall is very low (less than 25 centimetres per annum) whether the region is hot or not. About 30% of all the land surface of the earth is desert or in the process of becoming desert. Reclaiming desert is a very expensive operation and usually not very successful

desiccate *verb* to dry out; *cattle wander across the desiccated pastures in search of fodder*

◇ **desiccant** *noun* (i) substance which dries; (ii) type of herbicide which makes leaves wither and die

◇ **desiccation** *noun* act of drying out (the soil); *the greenhouse effect may lead to climatic changes such as the vast desiccation of Africa*

designate *verb* to name or appoint officially; *an area of woodland which has been designated a Site of Special Scientific Interest; the city has been designated a nuclear-free zone*

destroy *verb* to kill or to remove completely; *at this rate, all virgin rainforests will have been destroyed by the year 2020; the building of the motorway will destroy several areas of wild fen*

◇ **destruction** *noun* act of killing or removing completely; *the destruction of the habitat has led to the almost complete extinction of the species*

desulphurization *noun* process of removing sulphur from a substance such as oil or iron ore or coal

detect *verb* to sense or to notice (usually something which is very small or difficult to see); *an instrument to detect microscopic changes in cell structure; sensors detected an increase in radiation levels*

◇ **detectable** *adjective* which can be detected; *some toxic substances are invisible and only detectable by analysis in a laboratory*

◇ **detection** *noun* action of detecting something; *the detection of sounds by nerves in*

the ears; the detection of minute levels of lead in the atmosphere

QUOTE the increase in the amount of carbon dioxide, together with trace gases such as methane and nitrogen oxide, is likely to cause a detectable global warming

Scientific American

detergent *noun* cleaning substance which removes grease and bacteria from the surface of something

COMMENT: most detergents do not trigger allergies but some biological detergents, which contain enzymes to remove protein stains can cause skin rashes. The first detergents contained alkylbenzene sulphonate which did not degrade on contact with bacteria and so passed into sewage (creating large amounts of foam in sewers and rivers); some types of detergent are "biological", that is they are biodegradable, and so can be degraded by bacteria

deteriorate *verb* to become worse; *the quality of the water in the river has deteriorated since the construction of factories on its banks*

◇ **deterioration** *noun* becoming worse

QUOTE evidence for worldwide climatic deterioration is convincing and well-documented

New Scientist

determine *verb* to find out something correctly; *inspectors are trying to determine the source of the pollution*

detoxication or **detoxification** *noun* removal of toxic substances to make a poisonous substance harmless

detrimental *adjective* which can harm; *conservation groups have criticized the introduction of red deer, a species which is highly detrimental to local flora*

detritus *noun* waste matter (either organic or mineral)

◇ **detrital** *adjective* formed from detritus; (crystal) which has been uncovered from weathered rock

◇ **detritivore** *noun* animal which eats detritus

deuterium *noun* chemical element which is an isotope of hydrogen; **deuterium oxide** = heavy water or water formed with deuterium in place of hydrogen, used as a coolant in nuclear reactors

NOTE: the chemical symbol for deuterium is D; the symbol for heavy water is D₂O

develop *verb* (a) to grow (b) to plan and produce; **developed countries** = countries which have a high state of industrialization; **developing countries** = countries which are not fully industrialized (c) to plan and build on an area of land; *they are planning to develop the site as an industrial estate*

◇ **developer** *noun* person or company that plans and builds structures such as roads, airports, new houses, factories or office buildings; *the land has been acquired by developers for an industrial park*

◇ **development** *noun* action of developing; **economic development** = process where a country changes from agricultural to an industrialized one; **industrial development** = planning and building of new industries in special areas; **development area** or **development zone** = area which has been given special help from a government to encourage business and factories to be set up there; **development plan** = plan drawn up by a government or local council to show how an area should be planned over a long period

device *noun* machine or tool; *they have installed devices for measuring radiation on the site; the company has brought in a device for taking rock samples*

dew *noun* water which condenses on surfaces in the open air as humid air cools at night; **dew point** = temperature at which dew forms on grass or leaves, etc.

◇ **dew pond** *noun* small pond which forms on high chalky soil (it is formed from rainwater not dew)

diagram *noun* chart or drawing which records information as lines or points; *the book gives a diagram of the movement of air currents; the diagram shows the occurrence of cancer in the region of the nuclear power station*

dialysis *noun* using a membrane as a filter to separate soluble waste substances from a liquid

◇ **dialyzing membrane** *noun* membrane used in dialysis

COMMENT: in dialysis, larger dispersed particles are not allowed through the membrane but small dissolved particles will pass through

diameter *noun* distance across a circle (such as a tube or pipe)

diatom *noun* type of tiny algae, with a skeleton formed of silica, which makes up some basic organisms such as plankton

◇ **diatomaceous** *adjective* (earth or rock, such as kieselguhr) formed from the skeletons of diatoms

◇ **diatomist** *noun* scientist who studies diatoms; *diatomists have found that the lake is ten times more acid than it was ten years ago*

COMMENT: most of the producers in sea water food chains are diatoms. Bodies of diatoms have contributed to the formation of oil reserves

dichlorodiphenyltrichloroethane (DDT) *noun* highly toxic insecticide, no longer recommended for use

COMMENT: DDT is highly toxic and remains for a long time as a deposit in animal organisms. It gradually builds up in the food chain as smaller animals are eaten by larger ones, with the result that raptors (such as eagles and hawks) can be killed by the DDT which builds up in their systems from the bodies of smaller animals which they have eaten

dicotyledon *noun* plant of which the cotyledon has two leaves; *dicotyledons form the largest group of plants; compare COTYLEDON, MONOCOTYLEDON*

die *verb* to stop living; *the fish in the lake died poisoned by chemical discharge from the factory; scientists are trying to find out what makes the trees die*

◇ **die back** *verb* (of a branch or shoot of a plant) to die; *silver fir are known to die back from time to time*

◇ **dieback** *noun* (a) fungus disease of certain trees which kills shoots or branches (b) gradual dying of trees caused by acid rain (starting at the ends of branches); *half the trees in the forest are showing signs of dieback; see also WALDSTERBEN*

COMMENT: there are many theories to try to explain the causes of dieback: sulphur dioxide, nitrogen oxides, ozone, are all possible causes; also acidification of the soil or acid rain on leaves

◇ **die down** *verb* to become less strong; *the strong winds have died down*

dielrin *noun* organochlorine insecticide which kills on contact. It is very persistent and can kill fish, birds and small mammals when it enters the food chain

diesel *noun* special type of oil used in certain engines; *diesel-powered vehicles are one of the main sources of air pollution*

COMMENT: in a diesel engine, a quantity of oil is pumped to each cylinder in turn. Diesel-engined cars are usually more economical to run, but cause more pollution than petrol-engined cars

diet *1 noun* (i) amount and type of food eaten; (ii) measured amount of food eaten, usually to try to lose weight; *it lives on a diet of insects and roots; the normal western diet is too full of carbohydrates; balanced diet* = diet which contains the right quantities of basic nutrients; *low-calorie diet* = diet which provides less than the normal number of calories; *salt-free diet* = diet which does not contain salt **2 verb** to reduce the quantity of food eaten or to change the type of food eaten in order to become healthier

◇ **dietary** *adjective* referring to a diet; **dietary fibre** or **roughage** = fibrous matter in food, which cannot be digested

COMMENT: dietary fibre is found in cereals, nuts, fruit and some green vegetables. It is believed to be necessary to help digestion and avoid developing constipation, obesity and appendicitis

◇ **dietetic** *adjective* referring to diet

◇ **dietetics** *noun* study of food, nutrition and health, especially when applied to the food intake

difference *noun* way in which two things are not the same; *can you tell the difference between butter and margarine?*

◇ **different** *adjective* not the same; *living in the country is very different from living in town; the landscape looks quite different since the mine was opened*

◇ **differential** *adjective* showing a difference; depending on a difference; **differential heating** = differences in the amount of heat received when different surfaces are heated by the sun (white surfaces such as snow heat less than dark ones such as soil)

diffuse **1 verb** to spread through tissue; *some substances easily diffuse through the walls of capillaries* **2 adjective** (disease) which is widespread in the body or which affects many organs or cells

◇ **diffusion** *noun* (i) spreading (of gas or light); (ii) mixing a liquid with another liquid or a gas with another gas; (iii) passing of a liquid or gas through a membrane

digest *verb* (a) to break down food in the alimentary tract and convert it into elements which are absorbed by the body (b) to process waste, especially organic waste such as manure, to produce biogas; *55% of UK sewerage sludge is digested; wastes from food processing plants can be anaerobically digested*

◇ **digester** *noun* machine which takes refuse and produces gas such as methane from it; *anaerobic digesters can be used to convert cattle manure into gas*

◇ **digestible** *adjective* which can be digested; *glucose is an easily digestible form of sugar*

◇ **digestion** *noun* (i) process by which food is broken down in the alimentary tract into

elements which can be absorbed by the body;
(ii) process which produces biogas from refuse

◇ **digestive** *adjective* referring to digestion;
digestive enzymes = enzymes which speed up the process of digestion; **digestive system** = all the organs in the body (such as the liver and pancreas) which are associated with the digestion of food

QUOTE the digester was developed by a group of scientists concerned with technological efficiency

Appropriate Technology

QUOTE research has shown that up to 60% of the contaminants present in the sewage stream may be absorbed into the sludge removed in primary screening operations and then treated by digestion process

London Environmental Bulletin

dilute 1 *adjective* weak (solution) 2 *verb* to add water to a solution to make it weaker; *the disinfectant must be diluted in four parts of water before it can be used on the skin*; **dilute** and **disperse** = method of using unlined landfill sites where the waste is allowed to leak gradually into the surrounding soil NOTE: opposite is **concentrate**

◇ **diluent** *noun* substance (such as water) which is used to dilute a liquid

◇ **dilution** *noun* (i) action of diluting; (ii) liquid which has been diluted

COMMENT: dilution is one of the processes of sewage treatment whereby effluent is passed into a large quantity of water

dimethyl sulphide *noun* gas given off by water which is rich in sewage pollution

dioxide *see* CARBON

dioxin *noun* extremely poisonous gas formed as a by-product of the manufacture of the herbicide 2,4,5-T (this is the gas that escaped in the disaster at Seveso in 1976)

disaster *noun* terrible event which kills and causes massive destruction; **ecological disaster** = disaster which disturbs the ecological balance of the environment; **natural disaster** = phenomenon which occurs in nature (storm, flood, earthquake, etc.), which destroys property and kills people and livestock

discharge 1 *noun* (a) waste material from an industrial process which is passed into the environment; **discharge pipe** = pipe which takes waste from an industry into the environment; *discharge pipes take the liquid waste into the sea* (b) rate of flow of a liquid in a channel 2 *verb* to pass waste material into the environment; *the factory discharges ten tonnes of toxic effluent per day into the river*

QUOTE the mill was poorly ventilated and such dust as was extracted from the air was discharged to an atmosphere in close proximity to houses and a local school

Environment Now

disclimax *noun* stable ecological state which has been caused by human intervention (such as a desert caused by deforestation); **disclimax community** = stable plant community which is caused by human action (such as felling a rainforest for timber); *compare* CLIMAX

discolour or **US discolor** *verb* to change the colour of something, usually by making it paler

◇ **discoloured** or **US discolored** *adjective* with a changed colour

◇ **discoloration** *noun* change of colour

discontinuity *noun* band in the interior of the earth which separates two layers and through which seismic shocks do not pass; **Gutenberg discontinuity** = boundary separating the mantle from the core; **Mohorovičić discontinuity** = boundary between the crust and the mantle, below which seismic shocks move more rapidly

disease *noun* illness (of people or animals or plants, etc.) where the body functions abnormally; *he caught a disease in the tropics*; *the rice crop has been affected by a virus disease*; *he is a specialist in occupational diseases or in diseases which affect workers*

◇ **diseased** *adjective* (plant or person or part of the body) affected by an illness or not whole or normal; *to treat dieback, diseased branches should be cut back to healthy wood*

disinfect *verb* to make a place free from germs or bacteria; *all utensils must be thoroughly disinfected*

◇ **disinfectant** *noun* substance used to kill germs or bacteria

◇ **disinfection** *noun* removal of infection caused by germs or bacteria

NOTE: the words **disinfect** and **disinfectant** are used for substances which destroy germs on instruments, objects or the skin; substances used to kill germs inside infected people are **antibiotics, drugs, etc.**

disintegrate *verb* to come to pieces; *the wood had been eaten by termites and simply disintegrated*

◇ **disintegration** *noun* act of disintegrating

disperse *verb* (a) (of organisms) to spread over a wide area (b) to send out over a wide area; *power stations have tall chimneys to disperse the emissions of pollutants* (c) **dispersed particles** = particles which are not dissolved in a liquid but remain in suspension

◇ **dispersal** *noun* spreading of individual plants or animals into or from an area; *aphids breed in large numbers and spread by dispersal in wind currents*; water dispersal or wind dispersal = spreading of plants by seed carried away by water or blown by the wind

◇ **dispersion** *noun* pattern in which animals or plants are found over a wide area; *dispersion aerosol* = droplets of moisture which are blown into the air (as spray)

dispose of *verb* to get rid of something; *the problem with nuclear reactors is how to dispose of the radioactive waste*

◇ **disposal** *noun* getting rid of something; *the disposal of raw sewage into the sea is contaminating shellfish*

dissemination *noun* teaching about something or giving out information about a new process; *the dissemination of new technology in third world countries*

dissolve *verb* to melt or to make something disappear in liquid; *nitric acid readily dissolves in cloud droplets*

◇ **dissolvable** *adjective* (minerals) which can be dissolved

distil *verb* (a) to produce a pure liquid by heating the liquid and collecting the vapour; *distilled water* = pure water (it may be used in certain industrial processes and in electric batteries) (b) to produce by-products from coal

◇ **distillation** *noun* process of producing a pure liquid by heating and then condensing the vapour; *fractional distillation* = distillation process where different fractions are collected at different points

distribute *verb* to spread out over an area; *the species is widely distributed throughout Northern Europe*

◇ **distribution** *noun* pattern in which a species is found in various areas (it depends on climate, altitude, etc.); *the distribution of crop plants in various regions of the world is a result of thousands of years of breeding and testing*

district *noun* part of an area, especially for administrative purposes; *district heating* = system of heating of all houses in a district from a central source (as from hot springs in Iceland or by cooling water from a power station)

disturb *verb* to change the condition of something; *the building of the road has disturbed the balance of the ecosystem*

ditch *noun* channel dug by the side of a road to take away rainwater

diuresis *noun* increase in the production of urine

◇ **diuretic** *adjective & noun* (substance) which makes the kidneys produce more urine

diurnal *adjective* happening in the daytime or happening every day; *diurnal cycle* = cycle (as of air pollution) during the daytime; *diurnal rhythm* = regularly recurring activities which take place every day (such as feeding, sleeping, hunting, etc.)

diversify *verb* to do a number of different things; *farmers are encouraged to diversify land use by using it for woodlands or for recreational facilities*

◇ **diversification** *noun* changing to a different way of working

◇ **diversity** *noun* richness of the number of species in an area; *alpha diversity* = number of species in a small area; *beta diversity* = number of species in a wide region

QUOTE the scheme to help farmers diversify out of agriculture and so help farm income and rural development

Environment Now

divide *verb* to separate into parts; *the area was divided into quadrats for sampling purposes*

◇ **division** *noun* cutting into parts or splitting into parts; *cell division* = way in which a cell reproduces itself by mitosis

dizygotic twins or fraternal twins *noun* twins who are not identical (and not always of the same sex) because they come from two different ova fertilized at the same time; *compare IDENTICAL, MONOZYGOTIC*

DNA = DEOXYRIBONUCLEIC ACID

DoE GB = DEPARTMENT OF THE ENVIRONMENT

DOE US = DEPARTMENT OF ENERGY

doldrums *noun* area of low pressure over the ocean near the equator where there is little wind

dolphin *noun* marine mammal belonging to the Delphinidae, which also includes killer whales and pilot whales

◇ **dolphinarium** *noun* display pool where dolphins are shown to the public

domestic *adjective* referring to the home; *domestic animal* = animal (such as a dog or cat) which lives with human beings; *domestic livestock* = farm animals which live near the farmhouse; *domestic sewage or domestic waste* = sewage or waste from houses and flats

◇ **domesticated** *adjective* (i) (wild animal) which has been trained to live near a house

and not be frightened of humans; (ii) species which was formerly wild, now selectively bred to fill human needs

dominance *noun* (a) state where one group in society rules other groups (b) situation where energy tends to flow through one channel rather than another

◇ **dominant** 1 *noun* the plant or species which has most influence on the composition and distribution of other species of plants; *see also* CODOMINANT, SUBDOMINANT 2 *adjective* (genetic trait) which is more powerful than other recessive genes

COMMENT: since each physical trait is governed by two genes, if one is recessive and the other dominant, the resulting trait will be that of the dominant gene

dormancy *noun* state of an animal or plant, where metabolism is slowed during the winter months

◇ **dormant** *adjective* not actively growing; **dormant plant** = plant which is not actively growing (as during the winter); **dormant volcano** = volcano which is not in eruption; *compare* EXTINCT

dorsal *adjective* referring to the back (of an animal or leaf)

NOTE: opposite is **ventral**

dose *noun* amount of radiation received by a patient; *the patients received more than the allowed dose of radiation*; **exposure dose** = amount of radiation to which someone has been exposed

◇ **dosemeter** *noun* instrument for measuring a dose of radiation

double *verb* to multiply by two; **doubling time** = time a population takes to double in size

Douglas fir *noun* important North American softwood tree

downs *noun* GB grass-covered chalky hills characterized by low bushes and few trees

◇ **downland** *noun* area of downs

down draft or **down draught** *noun* (i) cool air which flows downwards as a rainstorm approaches; (ii) air which flows rapidly down the lee side of a building

◇ **downpipe** *noun* pipe carrying waste water from a roof to a soakaway

◇ **downstream** *adjective & adverb* towards the mouth of a river; *the silt is carried downstream and deposited in the delta*; *pollution is spreading downstream from the factory*

◇ **down wash** *noun* action which brings smoke from a chimney down to the ground as it is caught in a down draught

drain 1 *noun* (i) underground pipe which takes waste water from buildings; (ii) open channel for taking away waste water; **storm drain** = specially wide channel for taking away large amounts of rainwater which fall during tropical storms 2 *verb* (a) to remove liquid (b) (of liquid) to flow into; *the stream drains into the main river*

◇ **drainage** *noun* (a) removing of liquid; **drainage basin** = catchment area or area of land which collects and drains away the rainwater which falls on it (b) removing liquid waste from buildings; *the houses have no drainage system*

draught animals *noun* animals which are used to pull vehicles or carry heavy loads

COMMENT: considerable use is made of draught animals in many areas of the world. Oxen, buffaloes, yaks, camels, elephants, donkeys, horses are all used as draught animals. The advantages of using animals are many: they produce young so do not always have to be bought; they are cheaper to buy than machines; they do not use expensive fuel, even though they eat large quantities of food; they may be slower than machines but they can work in difficult terrains. Their most important advantage is that they are appropriate to the local conditions

drift *noun* slow movement; **drift current** = current in the sea caused by the wind; **littoral drift** = movement of sand as it is carried by the sea along the coastline; **North Atlantic Drift** = warm current which travels northwards along the east coast of North America and then crosses the Atlantic to hit the British Isles; **spray drift** = allowing spray to blow onto surrounding plants; *wildlife in hedges can be harmed by spray drift from fields*; *see* CONTINENTAL, GLACIAL

drizzle *noun* light persistent rain with drops of less than 0.5mm in diameter

◇ **drizzly** *adjective* (weather) with a lot of drizzle

drop 1 *noun* (a) small quantity of liquid; *a drop of acid burned through the material*; *drops of rain soon began to fall* (b) reduction or fall in quantity of something; **drop in pressure** = sudden reduction in pressure; *a drop in temperature of over 50° in one morning is uncommon* (c) fall (of fruit); **June drop** = fall of small fruit in early summer, which allows the remaining fruit to grow larger 2 *verb* to fall or to let something fall; *pressure began to drop as the storm approached*

◇ **droplet** *noun* very small drop of liquid

◇ **droppings** *noun* excreta from animals; *the grass was covered with rabbit and sheep droppings*

drought *noun* long period without rain at a time when rain normally falls; *relief agencies are bringing food to drought-stricken areas*

drowned valley *noun* valley which has been submerged by the advance of the sea or a lake

drupe *noun* fruit with a single seed and a fleshy body (such as a peach)

dry 1 *adjective* not wet or with the smallest possible amount of moisture; **dry adiabatic lapse rate** = rate of temperature change in rising dry air; *see also* LAPSE; **dry deposition** = falling of dry particles from polluted air (they form a harmful deposit on surfaces such as buildings or leaves of trees); **the dry season** = period in some countries when very little rain falls (as opposed to the rainy season); **dry ice** = carbon dioxide which has been frozen until it becomes solid 2 *verb* to remove moisture from something

◇ **dryness** *noun* state of being dry; *the dryness of the atmosphere on very high mountains*

◇ **drystone wall** *noun* wall made of stones carefully placed one on top of the other without using any mortar

◇ **dry up** *verb* (of a river or lake) to become dry; *the river bed dries up completely in summer*

duct *noun* tube or pipe which carries a liquid or air; *air-conditioning ducts need regular cleaning*

dump 1 *noun* place where waste is thrown away; *the mine is surrounded with dumps of excavated waste*; **municipal dump** = place where a town's refuse is placed after it has been collected 2 *verb* to throw away waste; *the UK dumps its industrial waste into the North Sea; the dumping of nuclear waste into the sea should be banned*

◇ **dumpsite** *noun* place where waste is dumped; *sludge bacteria can survive in seawater for long periods and are widely dispersed from dumpsites*

dunes *plural noun* area of sand blown by the wind into small hills and ridges which has very little soil or vegetation; *the village was threatened by encroaching sand dunes*

dung *noun* solid waste excreta from animals (especially cattle), often used as fertilizer; *they collected the dried dung in the fields and used it as fuel*

duramen *noun* heartwood, the hard wood in the centre of a tree's trunk

durum *noun* type of wheat grown in southern Europe and used for making pasta

dust *noun* fine powder made of particles of dry dirt or sand; **dust bowl** = large area of land where the strong winds blow away the dry topsoil (as in the south central plains of the USA in the 1930s); **dust burden** = amount of dust which is found suspended in a gas; **dust devil** = little whirlwind in the desert

◇ **dustbin** *noun* container into which household rubbish is placed to be collected by municipal refuse collectors

◇ **dust storm** *noun* storm of wind which blows dust and sand with it, common in North Africa

◇ **dust veil** *noun* mass of dust in the atmosphere (created by volcanic eruptions, storms, burning fossil fuels), which cuts off solar radiation and so reduces the temperature of the earth's surface; *compare GREENHOUSE EFFECT*

Dutch elm disease *noun* fungus disease caused by *Ceratocystis ulmi*. It kills elm trees and is spread by a bark beetle

dyke 1 *noun* (a) long wall of earth built to keep water out (b) ditch for drainage 2 *verb* to build walls of earth to help prevent water from flooding land

dynamometer *noun* machine which measures exhaust fumes from cars

dysentery *noun* infection and inflammation of the colon causing bleeding and diarrhoea

◇ **dysenteric** *adjective* referring to dysentery

COMMENT: dysentery occurs mainly in tropical countries. The symptoms include diarrhoea, discharge of blood, and pain in the intestines. There are two main types of dysentery: bacillary dysentery, caused by the bacterium *Shigella* in contaminated food; and amoebic dysentery or amoebiasis, caused by a parasitic amoeba *Entamoeba histolytica* spread through contaminated drinking water

dysphotic *adjective* referring to the area of water in a lake or the sea between the aphotic zone at the bottom of the water and the euphotic zone which sunlight can reach

dystrophic lake *noun* lake (as in a peat bog) where the water is acid, brown and peaty, and the dead vegetation does not decompose but settles at the bottom to form peat

Ee

E number classification of additives to food according to the European Community

COMMENT: additives are classified as follows: colouring substances: E100 - E180; preservatives: E200 - E297; antioxidants: E300 - E321; emulsifiers and stabilizers: E322 - E495; acids and bases: E500 - E529; anti-caking additives: E530 - E578; flavour enhancers and sweeteners: E620 - E637

vitamin E *noun* vitamin found in vegetables, vegetable oils, eggs and wholemeal bread

earth *noun* (a) the planet on which we live (b) soil, soft substance formed of mineral particles, decayed organic matter, chemicals and water in which plants can grow; **earth closet** = toilet in which faeces are covered with earth instead of being flushed away with water; **earth dam** = dam made of piled earth

COMMENT: the planet earth can be divided into various zones: the lithosphere (solid rock and molten interior), the hydrosphere (the water covering the earth's surface), the atmosphere (the gaseous zone rising above the earth's surface) and the biosphere (those parts of the other zones in which living organisms exist). The interior of the earth is formed by a central core made of nickel and iron, part of which is solid. Above the core is the mantle, a layer about 2,700km thick of molten minerals. On top of the mantle is the crust, formed of solid rock between six and seventy kilometres thick

earthquake *noun* phenomenon where the earth's crust or the mantle beneath it shakes, and the surface of the ground moves (it is caused by movement inside the earth's crust along fault lines, and often causes damage to buildings); *see also* EPICENTRE, FOCUS, MODIFIED MERCALLI SCALE, RICHTER SCALE, SEISMIC

◇ **earth sciences** *noun* sciences dealing with the planet earth, including geology and climatology

◇ **earthworks** *noun* constructions such as walls made from soil

◇ **earthworm** *noun* kind of invertebrate animal with a long thin body living in large numbers in the soil

COMMENT: earthworms provide a useful service by aerating the soil as they tunnel. They also eat organic matter and help increase the soil's fertility. It is believed that they also secrete a hormone which encourages rooting by plants

east *noun & adjective* one of the directions on the earth's surface, pointing towards the rising sun; **east wind** = wind blowing from the east

◇ **easterly** *adjective* towards the east; *the hurricane was moving in an easterly direction*

◇ **eastern** *adjective* in the east; *the main rain forests lie in the eastern half of the country*

ebb tide *noun* tide as it is going down; *the plan is to build a barrage with 7 GW of installed capacity, generating electricity on the ebb tide; compare FLOOD TIDE*

ebony *noun* black tropical hardwood, now becoming scarce

echo *noun* sound which is reflected back towards the person listening

◇ **echolocation** *noun* finding a location by sending out a sound signal and listening to the reflection of the sound (bats and whales find their way by using echolocation)

◇ **echosounding** *noun* finding the depth of water by sending a sound signal down to the bottom and calculating the distance from the time taken for the reflected sound to reach the surface again

eclipse *noun* situation when the shadow of the earth falls across the moon, or when the moon passes between the earth and the sun, in both cases cutting off the light visible from earth; **partial eclipse** = eclipse where only part of the sun or moon is hidden; **total eclipse** = eclipse where the whole of the sun or moon is hidden

ecocline *noun* changes which take place in a species as individuals live in different habitats

ecology *noun* study of the relationships among organisms and the relationship between them and their physical environment; **deep ecology** = extreme form of ecological thinking where humans are considered as only one species among many in

the environment and where large numbers of humans are seen as harmful to the environment in which they live; **human ecology** = study of man and communities, the place which they occupy in the natural world, and the ways in which they adapt to or change the environment

◇ **ecological adjective** referring to ecology; **ecological balance** or **balance of nature** = situation where relative numbers of organisms remain more or less constant (by polluting the environment, destroying habitats and increasing their own numbers, people can cause major changes in populations which may be irreversible); **ecological disaster** = disaster which seriously disturbs the balance of the environment; **ecological efficiency** = measurement of how much energy is used at different stages in the food chain or at different trophic levels; **ecological factors** = factors which influence the distribution of a plant species in a habitat; **ecological indicator** = species that has particular requirements (acid soil, low temperature, high rainfall, etc.) and whose presence in an area indicates that those requirements are also present in that area; **ecological niche** = all the characters (chemical, physical, biological) that determine the position of an organism or species in an ecosystem (commonly called the "role" or "profession" of an organism, e.g. an aquatic predator, a terrestrial herbivore) **ecological pyramid** = graphical representation of the structure of an ecosystem in terms of who eats what (the base is composed of producer organisms, usually plants, then herbivores, then carnivores. It may be measured in terms of number, biomass or energy); **ecological succession** = series of communities of organisms which follow on one after the other, until a climax community is established

◇ **ecologist noun (a)** scientist who studies ecology **(b)** person who is in favour of maintaining a balance between living things and the environment in which they live and so improve the life of all organisms

economic adjective (a) which provides enough money; *the farm is let at an economic rent; it is hardly economic for the company to continue in business if pollution controls are so expensive (b)* referring to finance or economics; **economic conservation** = management of nature to maintain a regular yield of natural resources; **economic crisis** or **economic depression** = state where a country is in financial collapse; **economic development** = expansion of the commercial and financial situation of a country, especially from a primary economy to an industrial economy; *the economic development of the region has totally changed since they discovered oil there; economic development results in increased pollution of the environment*; **economic efficiency** = making the best use of scarce natural resources; **economic ends** = aims which economic activity hopes to achieve; **economic geology** = study of soil and rock

formations for the purposes of commercial mineral extraction; **economic growth** = increase in the national income expressed as the production of goods and services shown as a percentage of increase per member of the population; *the country enjoyed a period of economic growth in the 1960s*

◇ **economical adjective** which saves money or materials or which is cheap; **economical car** = car which does not use much petrol; **economical use of resources** = using resources as carefully as possible

◇ **economics plural noun (a)** study of production, distribution, selling and use of goods and services **(b)** study of financial structures to show how a product or service is costed and what returns it produces; *the economics of town planning; I do not understand the economics of the coal industry*

◇ **economist noun** person who specializes in the study of economics; **agricultural economist** = person who studies the economics of the agricultural industry

◇ **economize verb** to economize on petrol = to save petrol

◇ **economizer noun** device which saves waste heat in a boiler, by transferring heat from waste gases to the water being heated or where water is pre-heated before passing to the main boiler

◇ **economy noun (a)** being careful not to waste money or materials; **an economy measure** = an action to save money or materials; **to introduce economies or economy measures into the system** = to start using methods to save money or materials; **economy car** = car which does not use much petrol **(b)** financial state of a country or way in which a country makes and uses its money; **black economy** = work which is paid for in cash or goods, but not declared to the tax authorities; **capitalist economy** = system where each person has the right to invest money, to work in business, to buy and sell with no restrictions by the state; **controlled economy** = system where business activity is controlled by orders from the government; **free market economy** = system where the government does not interfere in business activity in any way; **mixed economy** = system which contains both nationalized industries and private enterprise; **planned economy** = system where the government plans all business activity

ecoparasite noun parasite which is adapted to a specific host

◇ **ecophysiology noun** study of organisms and their functions and how they exist in their environment

◇ **ecospecies noun** subspecies of a plant

◇ **ecosphere noun** biosphere, part of the earth and its atmosphere where living organisms exist (including parts of the lithosphere, the hydrosphere and the atmosphere)

◇ **ecosystem noun** system which includes all the organisms of an area and the environment

in which they live; *European wetlands are classic examples of ecosystems that have been shaped by humans. For thousands of years they have provided pasture for livestock, reeds for thatching and fuel, silage and bedding for livestock*

COMMENT: an ecosystem can be any size, from a pinhead to the whole biosphere. The term was first used in the 1930s to describe the interdependence of organisms among themselves and with the living and non-living environment

ecotone *noun* area between two different types of vegetation (such as the border between forest and moorland), which may share the characteristics of both

◇ **ecotype** *noun* species that has special characteristics which allow it to live in a certain habitat

ecto- *prefix* meaning outside

ectoparasite *noun* parasite which lives on the skin or outer surface of the host but feeds on the inside by piercing the skin; *compare* ENDOPARASITE

ectoplasm *noun* (in cells) the outer and densest layer of the cytoplasm

edaphic *adjective* referring to soil; **edaphic climax** = climax caused by the soil in the area; **edaphic factors** = different soil conditions which affect the organisms living in a certain area

eddy *noun* whirlpool of air or of water in a current

edible *adjective* which can be eaten; **edible fungi** = fungi which can be eaten and are not poisonous

EFA = ESSENTIAL FATTY ACID

effect *noun* result of an action; *the effect of acid rain on the environment; radiation had a noticeable effect on animal life in the area*

◇ **effective** *adjective* which has an effect; *is there a safe and effective way of stopping pollution from factory chimneys?*; **effective height** = height above the ground when the plume of smoke from a factory chimney becomes horizontal

◇ **effectiveness** *noun* being effective

efficient *adjective* which works well or which functions correctly; *the new system of smoke control is extremely efficient*; **energy-efficient machine** = machine which is efficient in its use of fuel

◇ **efficiency** *noun* being efficient or making good use of fuel or nutrients; **ecological**

efficiency = measurement of how much energy is used at different stages in the food chain or at different trophic levels; **economic efficiency** = making the best use of scarce natural resources; **end-use efficiency** = efficient way of using a form of energy by the end user; **fuel efficiency** = percentage of the heat from burning a fuel which is actually converted into energy

◇ **efficiently** *adverb* in an efficient way

QUOTE suppose an efficient refrigerator conserves 1,000 kilowatt-hours per year, but costs \$100 more than a less efficient model

Scientific American

QUOTE much of the decline in energy consumption is due to the more efficient use of energy in homes and offices

Scientific American

QUOTE most of the changes in demand are met by varying the output of the larger coal-fired power stations and by running the less efficient stations during the daytime only

Ecologist

effluent *noun* sewage, especially liquid or solid waste from industrial processes; **effluent charge** = fee paid by a company to be allowed to discharge waste into the sea or a river; **effluent monitor** = device which monitors the radioactivity in liquid waste from nuclear power stations; **effluent standard** = amount of sewage which is allowed to be discharged into a river or the sea

EHO = ENVIRONMENTAL HEALTH OFFICER

ejecta *noun* ash and lava thrown up by an erupting volcano

eldrin *noun* organochlorine insecticide which is very persistent and can kill fish, birds and small mammals when it enters the food chain

electricity *noun* electron energy which can be converted to light or heat or power; *the pump is run by electricity; electricity is used to pump water into the irrigation channels*; **static electricity** = electricity which is in a static state as opposed to electricity which is flowing in a current; *see also* ELECTROSTATIC

◇ **electric** *adjective* worked by electricity; *used for carrying electricity; the drying system is heated by an electric heater; the electric cables are buried underground to avoid spoiling the landscape*; **electric storm** = thunderstorm or storm with thunder and lightning

COMMENT: electricity, though it is clean and relatively cheap to use, is an inefficient form of energy since more than 50% of the heat needed to make it is wasted. On the other hand, electricity is used to drive machines which could not be operated by other means

QUOTE using electricity for heating is an extravagant use of our energy resources because, apart from the very small hydroelectric contribution, we use steam turbines to turn the generators that produce our electricity. In steam turbines, steam is raised by heating water by means of coal, oil or nuclear energy. The steam driving the turbines is then condensed and returned to the boilers to be used again. This reuse increases the heat efficiency, but over 95% of our electricity comes from about one-third of the heat available in the primary fuel. The rest is wasted, except in those countries where the heat is used in Combined Heat and Power stations. Britain has no CHP stations

Ecologist

electrodialysis *noun* process by which ions dissolved in sea water are removed, making the water fit to drink

◇ **electromagnet** *noun* magnet made from a coil of wire through which an electric current is passed

◇ **electromotive force** *noun* force of electricity which flows as a current

◇ **electron** *noun* negative particle in an atom, balanced by a proton, but not found in the atom's nucleus; **electron microscope (EM)** = microscope which uses a beam of electrons instead of light

◇ **electronic** *adjective* referring to electrons; operated by devices using the motions of electrons to perform useful functions, as in a computer

◇ **electronics** *noun* science of applying the study of electrons and their properties to manufactured products such as calculators, computers, telephones, etc.

◇ **electrostatic** *adjective* referring to electricity which is not flowing; **electrostatic precipitator** = device for collecting minute particles of dust suspended in gas, by charging the particles as they pass through an electrostatic field

element *noun* chemical substance which cannot be broken down to a simpler substance; **essential element** = chemical element (such as carbon, hydrogen, oxygen) which is necessary to an organism's growth and function; **trace element** = substance which is essential to organic growth, but only in very small quantities

◇ **elemental** *adjective* in pure form or existing as a pure element; *the snail stores elemental sulphur in its shell*

COMMENT: there are 106 elements. The smallest form in which an element can exist is the atom. For a list of all the elements see the periodic table in the supplement

eliminate *verb* to get rid of (pests or waste matter); *they have eliminated smallpox in the*

country; mosquitoes were eliminated by a programme of spraying breeding grounds with oil

◇ **elimination** *noun* removal of waste matter

elm *noun* large hardwood tree which grows in temperate areas; *see also* DUTCH ELM DISEASE

el Niño *see* NINO

eluvium *noun* gravel formed by rocks as they are broken down into fragments where they are lying; *compare* ALLUVIUM

◇ **eluviation** *noun* action of leaching out particles and chemicals from the topsoil down into the subsoil

EM - ELECTRON MICROSCOPE

embankment *noun* wall made along a river bank to prevent the river from overflowing

embryo *noun* living organism which develops from a fertilized egg or seed (such as an animal in the first weeks of gestation or a seedling plant with cotyledons and a root)

◇ **embryonic** *adjective* referring to an embryo; (something) in the first stages of its development

emergence *noun* gradual upward movement of a land mass

emergency *noun* situation where immediate action has to be taken; **emergency shutdown** = rapid closing of a nuclear reactor if it seems that a dangerous situation is about to occur; **emergency ward** = hospital ward which deals with urgent cases (such as accident victims)

emigration *noun* movement of a species out of an area

emit *verb* to send out (smoke or radiation); *the chimney was found to be emitting twice as much pollution as was permitted*

◇ **emission** *noun* act of emitting something; substance that has been released; **gas emissions** can cause acid rain; **emission standard** = amount of an effluent or pollutant which is permitted to be released into the environment, such as the amount of sewage which can be discharged into a river or the sea; **emission standards for vehicles** = amount of pollutants (hydrocarbons, carbon monoxide and nitrogen oxides) which can be released into the atmosphere by petrol and diesel engines

QUOTE the EEC Commission has proposed the establishment of emission limit values for large combustion plants as part of a set of measures designed to achieve a substantial reduction in overall emissions of sulphur dioxide and nitrogen oxides

Environment

QUOTE 40% of gasoline vapour emissions occur at the gas pump. When gas is pumped into the car's fuel tank, built-up vapours are forced into the air

Environmental Action

emulsify *verb* to mix two liquids so thoroughly that they will not separate

◇ **emulsifier** *noun* substance added to mixtures of food (such as water and oil) to hold them together (used in sauces, etc.), and also added to meat to increase the water content, so that the meat is heavier (in the EC, emulsifiers and stabilizers have E numbers E322 to E495); see also **STABILIZER**

encroach on *verb* to come close to and gradually cover (something); *the dunes are encroaching on the pasture land; the town is spreading beyond the by-pass, encroaching on good quality farming land; trees are spreading down the mountain and encroaching on the lower more fertile land in the valleys*

endanger *verb* to put something in danger; *pollution from the factory is endangering the aquatic life in the lakes; endangered species = any species at risk of extinction*

COMMENT: The categories of the degree of risk of extinction as drawn up by the IUCN are: 1. Endangered: in danger of extinction and unlikely to survive if the causal factors continue to operate. 2. Vulnerable: will move into the endangered category in the near future if the causal factors continue to operate. 3. Rare: not endangered or vulnerable, but at risk of becoming so

endemic *adjective* (a) (plant or animal) that exists in a certain area; *the isolation of the islands has led to the evolution of endemic forms; the northern part of the island is inhabited by many endemic mammals and birds* (b) (pest or disease) which is very common in a certain area; *this disease is endemic to Mediterranean countries; see also EPIDEMIC, PANDEMIC*

endo- *prefix* meaning inside

◇ **endocrine** *adjective* (gland) without a duct which produces hormones which are introduced directly into the bloodstream (such as the pituitary gland)

◇ **endoparasite** *noun* parasite which lives inside the host; compare **ECTOPARASITE**

◇ **endothelium** *noun* membrane of special cells which lines the internal passages and

organs in the body, such as the heart, the blood vessels, etc.; compare **EPITHELIUM**

endrin *noun* type of broad-based organochlorine insecticide which is extremely toxic and persistent

end user *noun* consumer or person who uses the manufactured product; **end-use efficiency** = efficient way of using a form of energy by the end user

energy *noun* (i) force or strength to carry out activities; (ii) specifically, electricity; *you need to eat certain types of food to give you energy; primary energy* = energy needed to produce other forms of energy, such as fuel for heating or used in power stations; **energy balance** = measurements showing the movement of energy between organisms and their environment; **energy budget** = the levels of energy at different points in an ecosystem or an industrial process; **energy conservation** = avoiding wasting energy; **energy consumption** = amount of energy consumed by a person or an apparatus, shown as a unit; **energy crops** = crops, such as fast-growing trees, which are grown to be used to provide energy; **energy flow** = flow of energy from one trophic level to another in a food chain; **energy resources** = potential supplies of energy which have not yet been used (such as coal lying in the ground, solar heat, wind power, geothermal power, etc.); **energy value** or **calorific value** = heat value of food or number of Calories which a certain amount of a certain food contains; *a tin of beans has an energy value of 250 calories* ◇ **energize** *verb* to send electric power through power lines

COMMENT: energy is the capacity to do useful work and includes setting a process in motion, the production of heat and light, the emission of heat and light, the making of electricity, etc. It is measured in joules or calories. One joule is the amount of energy used to move one kilogram the distance of one metre, one calorie being the amount of heat needed to raise the temperature of one gram of water by one degree Celsius. The kilocalorie or Calorie is also used as a measurement of the energy content of food and to show the amount of energy needed by an average person. Energy conservation is widely practised to reduce excessive and costly consumption of energy. Reduction of heating levels in houses and offices, insulating buildings against loss of heat, using solar power instead of fossil fuels, increasing the efficiency of car engines, etc., are all examples of energy conservation

enhance *verb* to make something better or stronger

◇ **enhancer** *noun* artificial substance which increases the flavour of food, or even the

flavour of artificial flavouring that has been added to food (in the EC, flavour enhancers added to food have the E numbers E620 to 637)

enrich *verb* (i) to make richer or stronger; (ii) to increase the amount of uranium-235 in the fuel of a nuclear reactor; **fuel is enriched to 15% with fissile material**

◇ **enrichment** *noun* action of enriching the proportion of uranium-235 in nuclear fuel

ensilage or **ensiling** *noun* process of making silage for cattle by cutting grass and other green plants and storing it in silos

entomology *noun* study of insects

◇ **entomological** *adjective* referring to insects

◇ **entomologist** *noun* scientist who specializes in the study of insects; **medical entomologist** = scientist who studies insects which may carry diseases

entrap *verb* to catch and retain; **90% of sulphur emissions can be entrapped; coal-fired power stations should be equipped with the means of entrapping sulphur**

environment *noun* the surroundings of any organism, including the physical world and other organisms; **the built environment** = built-up areas seen as the environment in which humans live; **environment protection** = act of protecting the environment by regulating the discharge of waste, the emission of pollutants, and other human activities

COMMENT: the environment is anything outside an organism in which the organism lives. It can be a geographical region, a certain climatic condition, the pollutants or the noise which surround an organism. Man's environment will include the country or region or town or house or room in which he lives; a parasite's environment will include the intestine of the host; a plant's environment will include a type of soil at a certain altitude

◇ **environmental** *adjective* referring to the environment; **environmental forecasting** = forecasting the effects on the surrounding environment of new construction programmes; **environmental geology** = using the study of geology to solve problems concerned with the environment; **Environmental Health Officer (EHO)** = official of a local authority who examines the environment and tests for air pollution or bad sanitation or noise pollution, etc.; **normal environmental lapse rate** see LAPSE; **environmental protection** = ENVIRONMENT PROTECTION; **Environmental Protection Agency (EPA)** = administrative body in the USA which deals with pollution; **environmental quality standards** = amount of an effluent or pollutant which is accepted in a

certain environment, such as the amount of trace elements in drinking water or the amount of additives in food; **environmental resistance** = all the pressures like predation, competition, weather, food availability, which inhibit the potential growth of a population

◇ **environmentalist** *noun* person who is concerned with protecting the environment to keep it healthy

enzyme *noun* protein substance produced by living cells which catalyzes a biochemical reaction in living organisms NOTE: the names of enzymes mostly end with the suffix **-ase**

COMMENT: many different enzymes exist in organisms, working in the digestive system, in the metabolic processes and helping the synthesis of certain compounds. Some pesticides and herbicides work by interfering with enzyme systems or by destroying them altogether

EPA = ENVIRONMENTAL PROTECTION AGENCY

ephemeral *adjective* (plant or insect) which does not have a long life

epibiosis *noun* state where an organism lives on the surface of another, but is not a parasite

◇ **epibiont** *noun* organism which lives on the surface of another

epicentre *noun* point on the surface of the earth above the focus of an earthquake or in the centre of a nuclear explosion

epidemic *adjective & noun* (infectious disease) which spreads quickly through a large part of the population; **the disease rapidly reached epidemic proportions; the health authorities are taking steps to prevent an epidemic of cholera or a cholera epidemic; see also ENDEMIC, PANDEMIC**

◇ **epidemiology** *noun* study of diseases in a population, in particular how they spread and how they can be controlled

◇ **epidemiological** *adjective* referring to epidemiology

epigeal *adjective* (insect) which lives above ground; (plant) which appears as a seedling with cotyledons above the surface of the soil

epigenous *adjective* developing or growing on a surface

epilimnion *noun* top layer of water in a lake (it contains more oxygen and is warmer than the water below)

epiphyte *noun* plant which lives on another plant for physical support, but is not a parasite

of it; **nest epiphyte** = plant whose aerial roots and stems collect rotting organic matter from which the plant takes nutrients

episode *noun* occurrence or time when a certain phenomenon takes place; *there have been three serious acid rain episodes in the last four months; high sulphur dioxide episodes have killed several hundred birds : one time*

QUOTE pollution comes in periodic episodes, followed by intervals when the atmosphere remains fairly pure

Environment Now

QUOTE although the normal amounts of pollutant do not damage vegetation, a number of episodes occurred when concentrations rose to more than 60 parts per billion parts of water

New Scientist

epithelium *noun* layer(s) of cells covering an organ, including the skin and the lining of hollow cavities; *see also* ENDOTHELIUM, MESOTHELIUM

◇ **epithelial** *adjective* referring to the epithelium; **epithelial layer** = the epithelium

epizoite *noun* animal which lives on the surface of another, without being a parasite

equator *noun* imaginary line round the surface of the earth at an equal distance from the North and South Poles; *the area of rainforests lies around the Equator; celestial equator* = imaginary line in the sky above the terrestrial equator

◇ **equatorial** *adjective* referring to the equator; **equatorial regions** = land areas near the equator, mostly with a very hot and humid climate, except for land at high altitudes as in South America

equilibrium *noun* state of balance; **population equilibrium** = state where the population stays at the same level, because the number of deaths is the same as the number of births

equinox *noun* either of the two occasions in a year (spring and autumn) when the sun crosses the equator, producing a day and night of equal length

COMMENT: the two equinoxes are the autumnal equinox, which occurs about September 22nd and the spring or vernal equinox on about March 21st

equip *verb* to provide the necessary apparatus; *the operating theatre is equipped with the latest scanning devices*

◇ **equipment** *noun* apparatus or tools which are required to do something; *the centre urgently needs seismological equipment*

NOTE: no plural: for one item say "a piece of equipment"

eradicate *verb* to remove completely; *international action to eradicate glaucoma*

◇ **eradication** *noun* (i) removing completely; (ii) total extinction of a species

ergot *noun* fungus which grows on cereals, especially rye

◇ **ergotism** *noun* poisoning by eating cereals or bread which have been contaminated by ergot

erode *verb* to wear away; *the cliffs have been eroded by the sea*

◇ **erosion** *noun* wearing away of earth or rock by the effect of rain, wind, sea and the action of toxic substances; *grass cover provides some protection against soil erosion*

COMMENT: erosion can easily result from human activity. Cleared land in drought-stricken areas can produce dry soil which can blow away; felling trees removes the roots which bind the soil particles together and so exposes the soil to erosion by rainwater

erupt *verb* (of a volcano) to become active, i.e. to produce lava, smoke and hot ash, etc.

◇ **eruption** *noun* sudden violent ejection of lava, smoke and ash by a volcano; *several villages were destroyed in the volcanic eruption of 1978*

escape 1 *noun* (a) action of allowing toxic substances to leave a container; *the area around the reprocessing plant was evacuated because of an escape of radioactive coolant* (b) plant which was formerly cultivated but which has escaped by reproducing in the wild; animal which was formerly domesticated but has become wild; *compare* FERAL 2 *verb* to leave a container; to leave a cultivated or domestic area; *feral cats are cats which have escaped from households and become wild*

Escherichia *noun* one of the Enterobacteria commonly found in faeces; **Escherichia coli** = gram-negative bacillus associated with acute gastroenteritis in infants

essence *noun* concentrated oil from a plant, used in cosmetics and sometimes as analgesics or antiseptics

◇ **essential** *adjective* extremely important or necessary; **essential amino acid** = amino acid which is necessary for growth but which cannot be synthesized and has to be obtained from the food supply; **essential elements** = chemical elements (such as carbon, oxygen, hydrogen, nitrogen and many others) which are necessary to an organism's growth or function; **essential fatty acid** (EFA) =

unsaturated fatty acid which is necessary for growth and health; **essential oils** or **volatile oils** = concentrated oils from a scented plant used in cosmetics or as antiseptics

COMMENT: the essential amino acids are: isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan and valine. The essential fatty acids are linoleic acid, linolenic acid and arachidonic acid

establish *verb* (a) to settle permanently; *the starling has become established in all parts of the USA; even established trees have been attacked by the disease* (b) to decide what is correct or what is fact; *the inspectors have tried to establish the cause of the disaster*

estuary *noun* part of a river where it meets the sea and is partly composed of salt water

◇ **estuarine** *adjective* referring to estuaries; **estuarine plants** = plants which live in estuaries where the water is alternately fresh and salty as the tide comes in and goes out

ethanol *noun* alcohol produced from crops (such as potatoes) for use as fuel also present in drinking alcohols (whisky or gin or vodka, etc.) and used in medicines and as a disinfectant

ethical *adjective* concerning ethics; **ethical committee** = group of specialists who monitor experiments involving humans or who regulate the way in which members of the medical profession conduct themselves

◇ **ethics** *noun* code of working which shows how a professional group (such as doctors and nurses) should work, and in particular what type of relationship they should have with their patients

Ethiopian Region *noun* biogeographical region (part of Arctogeia) comprising Africa south of the Sahara

ethno- *prefix* meaning man; **ethnobotany** = study of the way plants are used by man

ethology *noun* study of the behaviour of living organisms (a branch of biology)

etiolation *noun* process by which a green plant grown in insufficient light becomes yellow and grows long shoots

eucalyptus *noun* Australian hardwood tree, with strong-smelling resin

Euglenophyta *noun* type of algae which are similar to Protozoa

euphotic zone or **photic zone** *noun* main body of water in the sea or a lake, which

sunlight can penetrate and in which photosynthesis takes place; *compare* APHOTIC

euryhaline *adjective* (organism) which can survive a wide range of salt levels in its environment; *compare* STENOHALINE

eurythermous *adjective* (organism) which can survive a wide range of temperatures in its environment; *compare* STENOTHERMOUS

eutrophy *verb* to fill up with nutrients; *the sea is becoming eutrophied with nutrients*

◇ **eutrophic** *adjective* (water) which is rich in dissolved organic and mineral nutrients; **eutrophic lake** = lake which has a high decay rate in the epilimnion (the top layer of water), and so contains little oxygen at the lowest levels (it has few fish but is rich in algae); *compare* OLIGOTROPHIC

◇ **eutrophication** *noun* process by which a lake becomes full of phosphates and other nutrients which encourage the growth of algae and kill other organisms

evaporate *verb* (i) to change liquid into vapour by heating; (ii) (of liquid) to change into vapour; *in tropical areas up to 75% of rainfall will evaporate; surface water quickly evaporates in the sun*

◇ **evaporation** *noun* changing liquid into vapour; *the evaporation of water from the surface of a lake*

◇ **evaporative** *adjective* which can evaporate

◇ **evapotranspire** *verb* to lose water into the atmosphere by evaporation and transpiration

◇ **evapotranspiration** *noun* loss of water in an area through evaporation from the soil and transpiration from plants

QUOTE deforestation is already disrupting the hydrological cycles that control rainfall. At least half of the rainwater that falls on most tropical forests is returned back to the atmosphere through evapotranspiration, hence the perpetual cloud that hangs over the world's great rainforests. The evaporated moisture is then carried by the wind to fall as rain in areas often many thousands of miles away

Ecologist

event *noun* time when a certain phenomenon takes place; *three exceptionally warm years - 1980, 1983 and 1987 - years in which El Niño events were at their height*

evergreen 1 *adjective* (plant) which does not lose its leaves in winter **2** *noun* tree or shrub which does not lose its leaves in winter; *compare* DECIDUOUS

evolution *noun* heritable changes in organisms which take place over a long period involving many generations

◇ **evolutionary** *adjective* referring to evolution; *evolutionary changes which have taken place over millions of years*

examine *verb* to look at or to investigate someone or something carefully; *the water samples were examined in the laboratory*

◇ **examination** *noun* looking at someone or something carefully; *they carried out an examination of the problem; examination of the house revealed traces of radon*

exceed *verb* to be more than (a certain limit); *the concentration of radioactive material in the waste exceeded the government limits; it is dangerous to exceed the stated dose = do not take more than the stated dose*

excess *noun & adjective* too much of a substance; *excess phosphates run off into the river system; in excess of = more than; exposure to radiation levels in excess of the permitted maximum*

◇ **excessive** *adjective* more than normal; *excessive ultraviolet radiation can cause skin cancer*

exchange *noun* act of taking one thing and putting another in its place; *cation exchange = exchange which takes place when the ions of calcium, magnesium and other metals found in soil replace the hydrogen atoms in acid; gas exchange = transfer of gases between an organism and its environment; ion exchange = exchanging of ions between a solid and a solution; ion-exchange filter or water softener = device attached to the water supply to remove nitrates or calcium from the water*

◇ **exchanger** *noun* device which exchanges; *heat exchanger = device which exchanges heat from one source and gives it to another (as in a heating system where a hot pipe goes through a water tank to heat it)*

excrement *noun* faeces

excrete *verb* to pass waste matter out of the body, especially to discharge faeces; *the urinary system separates waste liquids from the blood and excretes them as urine*

◇ **excreta** *plural noun* waste material from the body (such as faeces)

◇ **excretion** *noun* passing waste matter (faeces or urine or sweat or carbon dioxide) out of the system; *compare* SECRETE, SECRETION

exhaust 1 *noun* (i) expulsion of gases (e.g. sending out waste gases from an engine); (ii) part of an engine through which waste gases pass; *fumes from vehicle exhausts contribute a large percentage of air pollution in towns; exhaust fumes or exhaust gases = gases produced by the engine of a car or lorry as it burns petrol or fuel (including carbon dioxide and carbon monoxide); exhaust pipe = tube at the back of a car or truck out of which gases*

produced by burning petrol are sent out into the atmosphere NOTE: US English is **tailpipe 2** *verb* to use up completely

◇ **exhaustion** *noun* using up completely; *the exhaustion of the earth's natural resources*

exosphere *noun* highest layers of the earth's atmosphere, more than 650km above the earth's surface, composed almost entirely of hydrogen

expanded *adjective* (plastic) made into hard foam by blowing air or gas into it

COMMENT: expanded polystyrene and other plastics are extensively used for packaging. CFCs are sometimes used in their manufacture

explode *verb* to burst or make something burst violently, especially a bomb or explosive; *see also* EXPLOSION, EXPLOSIVE

exploit *verb* to take advantage of something; *large companies ruined the environment by exploiting the natural wealth of the forest; the birds have exploited the sudden increase in the numbers of insects*

◇ **exploitation** *noun* taking advantage of something to make money; *further exploitation of the coal deposits is not economic*

explosion *noun* sudden and violent expansion; *population explosion = sudden increase in the number of organisms, especially of people in a country*

◇ **explosive 1** *adjective* (a) which may cause a rapid expansion (like a bomb); *continuing deprivation is causing a potentially explosive situation in urban areas* (b) (virus) which increases very rapidly 2 *noun* substance (such as gunpowder) which can explode

QUOTE the disaster started with heavy autumn rains in the Western Sahara, causing a population explosion among locusts

New Scientists

exponential *adjective* quantity which varies as the power of another quantity; *exponential growth = type of growth rate of a population which varies in proportion to the number of individuals present: at first the growth rate is slow, then it rapidly increases, theoretically to infinity, but in practice it falls off as the population exhausts its food, accumulates poisonous waste, etc.*

◇ **exponentially** *adverb* very rapidly; *we can expect pollution to increase exponentially over the next years*

expose *verb* (a) to show something which was hidden; *the report exposed a lack of supervision in maintenance of the reactor* (b) to expose something or someone to = to place something or someone under the influence of

something; *she was exposed to a lethal dose of radiation*

◇ **exposure** *noun* (a) being exposed; *his exposure to radiation*; **exposure dose** = amount of radiation to which someone has been exposed (b) being damp, cold and with no protection from the weather; *the survivors of the crash were all suffering from exposure after spending a night in the snow*

QUOTE exposure to the general background level of airborne asbestos gives rise to a risk which is low in comparison with other risks of life

London Environmental Bulletin

extended family *noun* family group which includes not only the nuclear family (the parents and their offspring) but also other blood relatives

extensive *adjective* (way of farming) which is not intensive or does not try to get as large a yield as possible; *an extensive system of pig farming*

◇ **intensification** *noun* using less intensive ways of farming

COMMENT: less intensive use of farming involves using fewer chemical fertilizers, leaving uncultivated areas at the edges of fields, reducing sizes of herds of cattle, etc. This allows lower yields from the same area of farmland, which is necessary if production levels are too high (as they are in the EEC)

external *adjective* which is outside; **external effects** or **externalities** = costs to society of industrial processes which are not reflected in the price of the product sold (as in the case of the environmental effects of a power station)

exteroceptor *noun* sensory nerve such as the eye or ear, which is affected by stimuli from outside the body; *see also* CHEMORECEPTOR, INTEROCEPTOR, RECEPTOR

extinct *adjective* (a) (species) which has died out; *one species of animal or plant becomes*

extinct every day; several native species have become extinct since sailors in the nineteenth century introduced dogs to the island (b) (volcano) which is no longer able to erupt; *compare* DORMANT

◇ **extinction** *noun* dying out of a species; *the last remaining examples of oryx were taken to zoos for breeding purposes, so as to save the species from extinction; the introduction of European species caused the extinction of the native species*

extract 1 *noun* preparation made by removing water or alcohol from a substance, leaving only the essence 2 *verb* (i) to take out of the ground or to mine minerals; (ii) to remove the essence from a liquid

◇ **extraction** *noun* action of extracting; *the extraction of coal from the mine is becoming too costly; gas extraction* = pumping gas out of a landfill site to use as fuel; *extraction fan* = EXTRACTOR FAN

◇ **extractor** *noun* machine which extracts, such as one which removes fumes or gas from a place; **extractor fan** = small fan which removes fumes or smoke, etc. from a kitchen or factory

extrusive *adjective* (rock) which has formed from molten lava which has pushed up through the earth's crust

eye *noun* (a) part of the body with which an animal sees; **eye bank** = place where parts of eyes given by donors can be kept for use in grafts (b) central point of a tropical storm

COMMENT: the eye of a typhoon is the point of lowest pressure, where the wind is light. As the storm approaches, winds grow in intensity until they are strongest just before the eye passes over the spot. The eye can be several kilometres wide and may take some minutes to pass. When it has passed, the winds begin again, but from the opposite direction

eyesore *noun* something which is unpleasant to look at; *the lake full of old bottles and cans is an eyesore and should be cleaned up*

Ff

F 1 abbreviation for Fahrenheit **2** chemical symbol for fluorine

◇ **F₁** noun (in breeding experiments) the first generation of offspring; **F₁ hybrid** = plant produced by breeding two parent plants, which is stronger than the parents, but which will not itself breed true

facies noun appearance of something or 'face' of an animal; **neritic facies** = appearance of sedimentary rocks laid down in shallow water, where the ripple marks made by waves are easily visible

factor noun (a) something which has an influence, which makes something else take place; **ecological factors** = factors which influence the distribution of a plant species in a certain market; **growth factor** = chemical substance produced in one part of the body which encourages the growth of a type of cell (such as red blood cells); **hereditary factors** = characteristics which are passed from parent to offspring in genes (b) the number that multiplies in a multiplication; **by a factor of ten** = ten times or multiplied by ten

QUOTE nitrates and sulphates have increased by factors of 2 and 3.5 respectively in the Arctic in the 200 years since the Industrial Revolution

New Scientist

QUOTE the dilution of the acid lowers the concentration of sulphur and nitrogen compounds in precipitation by a factor of between 3 and 30

Scientific American

factory noun building where products are manufactured; *smoke from factory chimneys blew across the town; the planning department has refused permission to site the new chemical factory in the middle of a residential district; illegal discharge of slurry from factory farms can contaminate the water system; factory farming* = highly intensive rearing of animals characterized by keeping large numbers of animals indoors in confined spaces and feeding them artificial foods, with frequent use of drugs to control diseases which are a constant threat under these conditions; **factory inspector** or **inspector of factories** = government official who inspects factories to see if they obey government regulations; **factory ship** = large ship which processes fish caught by a fishing fleet

faeces or **excreta** plural noun solid waste matter passed from the bowels after food has been eaten and digested

◇ **faecal** adjective referring to faeces; **faecal matter** = solid waste matter from the bowels
NOTE: also spelt **feces**, **fecal** especially in the USA

Fahrenheit noun scale of temperatures where the freezing and boiling points of water are 32° and 212°; compare CELSIUS, CENTIGRADE

NOTE: used in the USA, but less common in the UK. Normally written with an F after the degree sign: 32°F (say: 'thirty-two degrees Fahrenheit'). To convert Fahrenheit temperatures to Celsius, subtract 32, multiply by 5 and divide by 9: so 68°F equals 20°C. As a quick rough estimate, subtract 30 and divide by two

fall 1 noun (a) becoming less; *after installing filters, there was a fall in the emission of particles of ash* (b) something which comes down; **fall of snow** or **snowfall** = quantity of snow which comes down at any one time; *there was a heavy snowfall during the night; see also RAINFALL* (c) **US** = **AUTUMN 2** verb (a) to become less; *barometric pressure is falling, and a storm is likely to pass over the area during the next twenty-four hours; radiation levels have fallen* (b) to drop down; *snow fell all night; no rain has fallen in the area for over six months*

◇ **fallout** noun polluting matter which falls from the atmosphere as particles, either in rain or as dust; **nuclear fallout** = radioactivity which falls from the atmosphere after a nuclear explosion

◇ **falls** noun waterfall

NOTE: often used in names: **Niagara Falls**, **Victoria Falls**

◇ **fallspeed** noun speed at which raindrops or dry particles fall through the air

◇ **fallstreak** noun column of ice particles which are falling through a cloud

QUOTE the overall level of radioactivity in the vegetation eaten by sheep has fallen by one-fifth over the last year

New Scientist

fallow adjective (land) which is not used for growing crops for a period so that the nutrients can build up again in the soil; **to let**

land lie fallow = to allow land to stand without being cultivated; *see also* BUSH-FALLOW

family *noun* (a) group composed of parents and offspring; **extended family** = family group which includes not only the nuclear family but also other blood relatives; **nuclear family** = main family group composed of two parents and their offspring (b) group of genera which have certain characteristics in common (several families form an order); *tigers and leopards are members of the cat family*

NOTE: names of families of animals end in **-idae** and of families of plants in **-ae**

famine *noun* period of severe shortage of food; *when the monsoon failed for the second year, the threat of famine became more likely*; **famine relief** = sending supplies of basic food to help people who are starving

fan out *verb* to spread out from a central point

◇ **fanning** *noun* spreading out of a horizontal layer of smoke and other pollutants from a chimney

farm 1 *noun* area of land owned or worked by one family, used to grow crops and to keep animals to provide food 2 *verb* to run a farm; to keep animals for sale or to grow crops for sale

◇ **farmer** *noun* person who owns or works a farm; **dairy farmer** = farmer who breeds cattle for milk; **farmer's lung** = form of asthma caused by an allergy to rotting hay

◇ **farmhouse** *noun* house where a farmer and his family live

◇ **farming** *noun* working a farm by growing crops or keeping animals for sale, and producing cereals, vegetables, meat, dairy products, etc.; **contour farming** = method of cultivating sloping land, where the land is ploughed along a level across the slope, to prevent soil erosion; *see also* ARABLE, DAIRY, FACTORY FARMING, FISH FARMING

◇ **farmland** *noun* cultivated land or land which is used for raising crops or animals for food

◇ **farmyard** *noun* area around the farm buildings; **farmyard manure** = manure formed of cattle excreta mixed with straw, used as a fertilizer

fast *adjective* which takes place in a short period of time; **fast breeder reactor (FBR)** = nuclear reactor which breeds plutonium-239 from uranium-238, using enriched fuel which produces fast-moving neutrons; **fast fission** = nuclear fission of the uranium-238 isotope, which is much faster than that of uranium-235

fat 1 *adjective* having a lot of (or too much) flesh on the body; *the price of fat cows has increased* 2 *noun* (a) white or oily substance in the body which stores energy and protects the

body against cold; **body fat** or **adipose tissue** = tissue where the cells contain fat, which replaces the normal fibrous tissue when too much food is eaten; **brown fat** = animal fat which can easily be converted to energy and is believed to offset the effects of ordinary white fat; **saturated fat** = fat which has the largest amount of hydrogen possible; **unsaturated fat** = fat which does not have a large amount of hydrogen, and so can be broken down more easily (b) type of food which supplies protein and Vitamins A and D, especially that part of meat which is white or solid substances (like lard or butter) produced from animals and used for cooking or liquid substances like oil

◇ **fat-soluble** *adjective* which can dissolve in fat; *Vitamin D is fat-soluble*; *PCBs are fat-soluble and so collect in the blubber of seals*

◇ **fatstock** *noun* livestock which has been fattened

◇ **fatten** *verb* to give animals more food so as to make them fat; *he buys lambs for fattening and then sells them for meat*

◇ **fatty** *adjective* containing fat; **fatty acid** = acid (such as stearic acid) which is an important substance in the body; **essential fatty acid (EFA)** = unsaturated fatty acid which is essential for growth but which cannot be synthesized by the body and has to be obtained from the food supply

COMMENT: fat is a necessary part of diet because of the vitamins and energy-giving calories which it contains. Fat in the diet comes from either animal fats or vegetable fats. Animal fats such as butter, fat meat or cream, are saturated fatty acids. It is believed that the intake of unsaturated and polyunsaturated fats (mainly vegetable fats and oils, and fish oil) in the diet, rather than animal fats, helps keep down the level of cholesterol in the blood and so lessens the risk of atherosclerosis. A low-fat diet does not always help to reduce weight

fault *noun* line of a crack in the earth's crust along which movements can take place leading to major earthquakes; **San Andreas Fault** = major fault line in California, running north parallel to the coast, near to San Francisco

◇ **fault-plane** *noun* face of the rock at a fault where one mass of rock has slipped against another

fauna *noun* wild animals and birds which live naturally in a certain area; *see also* FLORA
NOTE: plural is **fauna** or **faunas**

FBC = FLUIDIZED-BED COMBUSTION

FBR = FAST BREEDER REACTOR

FC = FIBRE-CONCRETE

Fe *chemical symbol* for iron

feed 1 *noun* food given to animals; *traces of pesticide were found in the cattle feed* 2 *verb* (a) to eat food; to give an animal or a person food to eat; *feeding grounds* = areas where animals come to feed; *estuaries are winter feeding grounds for thousands of migratory birds* (b) to lead into and so make larger; *several small streams feed into the river*

◇ **feeder** *noun* (a) animal which feeds; *bottom-feeders* = fish which feed on food found at the bottom of the water; *filter-feeders* = fish which eat particles of detritus floating in water; *plant-feeders* = animals which feed on grass and other plants (b) device which feeds; *feeder reservoir* = small reservoir which feeds another; *feeder stream* = small stream which feeds into a river

◇ **feedlot** *noun* field with small pens in which cattle are fattened

COMMENT: a new type of feedlot is an area of land surrounded by an earth embankment, which protects the cattle from cold winds while they are being fed intensively. See also CHILLSHELTER

feedback *noun* (i) information; (ii) mechanism by which a process can regulate itself by the product it produces; *we are getting some feedback from workers in the area about the distribution of relief supplies*; *positive feedback* = situation where the result of a process stimulates the process which caused it (as when a change at one trophic level affects all levels above it)

QUOTE the changing carbon dioxide content of the atmosphere amplifies the change in a feedback

New Scientist

feldspar *noun* common type of crystal rock formed of silicates

fell 1 *noun* high moor and mountain in the North of England 2 *verb* to cut down (a tree); see also CLEARFELL

female *adjective & noun* animal which produces ova and bears young; (flower) which has carpels but not stamens

fen *noun* large area of flat marshy land, with reeds and mosses growing in alkaline water

◇ **fenland** *noun* area of land covered by fens

feral *adjective* (animal) which was formerly domesticated and has since reverted to living wild; *the native population of rabbits was exterminated by feral cats*

fermentation *noun* process whereby carbohydrates are broken down by enzymes from yeast and produce heat and alcohol

fern *noun* type of green plant which propagates itself by spores from its leaves, and not seeds, therefore it has no flowers

ferro- *prefix* referring to iron

◇ **ferrous** *adjective* referring to or containing iron

◇ **ferruginous** *adjective* (rock or water) which contains iron

fertile *adjective* (i) able to bear fruit; (ii) (of animal) able to produce young; (iii) (of soil) able to produce good crops

◇ **fertility** *noun* (i) being fertile; (ii) proportion of eggs which develop into young; **fertility rate** = number of births per year (in humans, per thousand females aged between 15 and 44)

NOTE: the opposite is **sterile**, **sterility**

◇ **fertilization** *noun* joining of an ovum and a sperm to form a zygote and so start the development of an embryo

◇ **fertilize** *verb* (a) to put fertilizer on land (b) (of a sperm) to join with an ovum

◇ **fertilizer** *noun* chemical or natural substance spread and mixed with soil to make it richer and stimulate plant growth; **artificial fertilizers** or **chemical fertilizers** = fertilizers which are manufactured from chemicals; **nitrogen fertilizers** = fertilizers containing mainly nitrogen

COMMENT: organic materials used as fertilizers include manure, slurry, rotted vegetable waste, bonemeal, fishmeal, seaweed. Inorganic fertilizers are also used, such as powdered lime or sulphur. In commercial agriculture, artificially prepared fertilizers (manufactured compounds containing nitrogen, potassium and other chemicals) are most often used, but excessive use of them can cause pollution, when all the chemicals are not taken up by plants and the excess is leached out of the soil into rivers and may cause algal bloom

QUOTE excessive amounts of potassium lead to poor fertility in dairy cows grazing intensively fertilized pastures. High levels of nitrate in grass are suspected of causing liver damage in cows

Ecologist

FGD = FLUE GAS DESULPHURIZATION

fibre or **US fiber** *noun* (a) organic structure shaped like a thread (in plants forming the structure of the stems, and in animals forming connective tissue) (b) **dietary fibre** = fibrous matter in food which cannot be digested; **high fibre diet** = diet which contains a high percentage of cereals, nuts, fruit and vegetables

◇ **fibre-concrete (FC)** *noun* construction material made of sand, cement and fibre, used for making roofing tiles, light walls, etc.

◇ **fibrous** *adjective* made of a mass of fibres; **fibrous rooted plants** = plants with roots which are masses of tiny threads, with no major roots like taproots

COMMENT: dietary fibre is found in cereals, nuts, fruit and some green vegetables. There are two types of fibre in food: insoluble fibre (in bread and cereals) which is not digested and soluble fibre (in vegetables and pulses). Foods with the highest proportion of fibre are bread, beans and dried apricots. Fibre is thought to be necessary to help digestion and avoid developing constipation, obesity and appendicitis

fidelity *noun* degree to which an organism stays in one type of environment

field *noun* (a) area of cultivated land, usually surrounded by a fence or hedge, used for growing crops or for pasture; **field botanist** = botanist who examines plants in their growing habitat; **field observations** or **observations in the field** = observations taken in the open air, looking at organisms in their natural habitat (as opposed to laboratory observations) (b) (i) physical area; (ii) area of natural resources (such as an oilfield); **field of vision** = area which can be seen without moving the eye; **magnetic field** = area round a body with magnetic power, within which its magnetic force is felt (the Earth's magnetic field is concentrated round the two magnetic poles) (c) area of interest; *he specializes in the field of environmental health*

◇ **fieldwork** *noun* study of organisms in their natural habitat (as opposed to in a laboratory)

film *noun* (a) roll of material which is put into a camera for taking photographs (b) very thin layer of a substance, especially on the surface of a liquid; *a film of oil on the surface of water*

filter 1 *noun* piece of paper or cloth through which a liquid is passed to remove solid substances in it; **filter basin** = large tank through which drinking water is passed to be filtered; **filter bed** = layer of charcoal or clinker, etc. through which liquid sewage is passed to clean it; **filter feeder** = fish which eats particles of detritus floating in the water **2 verb** to pass a liquid through a piece of paper or cloth to remove solid substances; *impurities are filtered from the liquid by passing it through layers of charcoal*

◇ **filtrate** *noun* liquid which has passed through a filter

◇ **filtration** *noun* passing a liquid through a filter to remove particles in it

fine *adjective* (a) (particle or grain of sand) which is very small; *particles of fine ash are carried into the upper atmosphere* (b) (weather) which is warm, sunny, with few clouds and no rain or fog

finite *adjective* which has an end; *coal supplies are finite and are forecast to run out in 1995*; **finite resources** = resources which will in the end be used up (such as reserves of coal or oil) NOTE: opposite is **renewable**

fiord - FJORD

fir *noun* common evergreen softwood tree

◇ **fircone** *noun* hard casing of the seeds of a fir tree

fire *noun* substance in the state of burning, which can be seen in the form of flames or a glow; *forest fires create huge amounts of atmospheric pollution*; **fire climax** = condition by which an ecosystem is maintained by fire

◇ **firebreak** *noun* (in a forest) area where no trees are planted, so that a forest fire cannot pass across and spread to other parts of the forest

◇ **firedamp** *noun* methane or inflammable gas found in mines

◇ **-fired** *suffix* meaning burning as a fuel; *coal-fired power station*; *gas-fired central heating*

QUOTE ecologists accept that forest fires are, over the long term, essential for vigorous tree growth. Burning clears out undergrowth that might choke saplings, removes old dead wood and recycles nutrients into the soil

Nature

firm *no in* névé, spring snow on high mountains which becomes harder during the summer

fish 1 *noun* cold-blooded aquatic vertebrate, some species of which are eaten for food (fish are high in protein, phosphorus, iodine and vitamins A and D. White fish have very little fat); **fish farming** = breeding edible fish in special pools for sale as food **2 verb** to try to catch fish (for food)

◇ **fisherman** *noun* man who catches fish as an occupation

◇ **fishery** *noun* (a) catching fish (as a business) (b) area of sea where fish are caught; *the boats go each year to the rich fisheries off the north coast*; **fishery protection zone** = area of sea round a country where fishing is regulated; *a 200-mile fishery protection zone has been established round the islands*

◇ **fishing** *noun* catching fish; **fishing zone** = area of sea which can be fished

◇ **fishmeal** *noun* dried fish reduced to a powder, used as an animal feed or as a fertilizer

◇ **fish pass** *noun* channel near a dam, specially built to allow fish (such as salmon) to by-pass the dam and swim up or down the river

fissile *adjective* (a) (rock) which can split or can be split (b) (isotope) which can split on impact with a neutron

◇ **fission 1** *noun* (a) splitting (as of the cells of bacteria) (b) **atomic fission** or **nuclear fission** = splitting of the nucleus of an atom (such as uranium-235) which then releases energy and neutrons; **fast fission** = nuclear fission of the uranium-238 isotope, which is much faster than that of uranium-235 2 *verb* to split (in nuclear fission); *when the plutonium is fissioned, fast neutrons are produced*

◇ **fissionable** *adjective* fissile, (isotope) which can be split

fissure *noun* crack or groove in rock

fitness *noun* measure of evolutionary success, applied to genes, traits, organisms and populations; **Darwinian fitness** = a measure of reproductive success or the success of organisms at passing on their genes to subsequent generations; **inclusive fitness** = the sum of an organism's Darwinian fitness with the fitness of its relatives

fixation *noun* act of fixing something; **nitrogen fixation** = conversion of nitrogen in the air into nitrogen compounds in bacteria, some of which live in plants allowing the plants to live in nitrogen-poor soil

fjord *noun* long inlet of the sea among mountains (in temperate or arctic regions)

flake *noun* a unit of snow, small piece of snow which falls from the sky

flash *noun* something which happens very rapidly; *a flash of lightning*; **flash flood** = sudden rush of water in a small stream, often causing damage

flatfish *noun* type of fish which lives on the bed of the sea or lake and has both eyes on the top of the body (such as a sole)

◇ **flatworm** *noun* any of several types of parasitic worm with a flat body (such as a tapeworm)

flea *noun* small insect which lives as a parasite on animals, sucking their blood and causing disease, such as bubonic plague

flightless bird *noun* bird (such as the ostrich) which has small wings and cannot fly

flocculation *noun* gathering together in lumps (used of impurities in water which form lumps before settling to the bottom of a tank)

◇ **flocculant** *noun* substance added to water as it is treated to encourage impurities to settle

flock *noun* large group of birds or herbivorous animals; *a flock of geese*; *a flock of sheep*

floe *noun* ice floe = sheet of ice floating on the sea

flood 1 *noun* large amount of water covering land which is normally dry (caused by melting snow, heavy rain, high tides, storms, etc.); *after the rainstorm there were floods in the valleys*; *the spring floods have washed away most of the topsoil*; **flood alleviation** or **flood control measures** = ways of controlling rivers which are liable to flood; **flood damage** = damage caused by floodwater 2 *verb* to cover dry land with a large amount of water; *the river bursts its banks and floods the whole valley twice a year in the rainy season*

◇ **flooding** *noun* action of covering land with water; *severe flooding has been reported in the north of the country*

◇ **floodplain** *noun* wide flat part of the bottom of a valley which is usually covered with water when the river floods

◇ **flood tide** *noun* tide which is rising or which is at its highest; *compare* EBB TIDE

◇ **floodwater** *noun* water which floods land; *after the floodwater receded the centre of the town was left buried in mud*

floor *noun* ground at the bottom of something; *fish which live on the floor of the ocean*; *the forest floor is covered with decaying vegetation*

flora *noun* (i) wild plants of a certain region; (ii) book or list describing the plants of a region; *compare* FAUNA

◇ **floral** *adjective* referring to plants or flowers

◇ **floret** *noun* little flower which forms parts of a larger composite flower head

flourish *verb* to live well and spread; *the colony of rabbits flourished in the absence of any predators*; *the island has a flourishing plant community*

flow 1 *noun* (a) movement of liquid (b) amount of liquid which is moving; *the meter measures the flow of water through the pipe* 2 *verb* (of liquid) to go past; *the water flows through the pipe and turns the turbine*

◇ **flowmeter** *noun* meter attached to a pipe to measure the speed at which a liquid or gas passes in the pipe

flower *noun* usually brightly-coloured reproductive part of a plant, with an external calyx, petals, stamens and pistils which bear pollen

fluctuate verb to vary or to rise and fall, the average annual temperature of the earth fluctuates very little, most populations fluctuate within fairly narrow limits

◇ **fluctuation** noun movement or change; small fluctuations in the earth's average temperature can have important climatic results

flue noun tube through which gas or smoke is released from a furnace; **flue gases** are passed directly into the atmosphere; **flue gas desulfurization (FGD) plant** = device which traps sulphur in emissions from coal-burning furnaces and prevents it reaching the atmosphere; **flue gas scrubber** = device for cleaning flue gas of particles of pollutant

QUOTE in flue gas desulfurization wet limestone is sprayed into the plant's hot exhaust gases, where it scavenges as much as 90% of the sulphur dioxide.

Scientific American

fluid noun liquid or substance which can flow

◇ **fluidized-bed combustion (FBC)** noun method of burning low-grade fuel while keeping the emission of pollutant gases to a minimum; see also PRESSURIZED FBC

flake noun parasitic flatworm which settles inside the liver (liver flukes), in the blood stream (Schistosoma) and other parts of the body

fluoride noun any chemical compound of fluorine (usually found with sodium or potassium or tin)

◇ **fluoridate** verb to add sodium fluoride to drinking water

◇ **fluoridation** noun adding sodium fluoride to drinking water to prevent tooth decay

◇ **fluorine** noun chemical element (a yellowish gas) NOTE: chemical symbol is F; atomic number is 9

◇ **fluorocarbon** noun compound of fluorine and carbon; see also CHLOROFLUOROCARBON

◇ **fluorosis** noun condition caused by excessive fluoride in drinking water or in eaten vegetable matter (it causes discoloration of the teeth and affects the milk yields of cattle)

COMMENT: fluorides such as hydrogen fluoride are emitted as pollutants from certain industrial processes and can affect plants (especially citrus fruit) by reducing chlorophyll. They also affect cattle by reducing milk yields. On the other hand, sodium fluoride will reduce decay in teeth, and is often added to drinking water or to toothpaste. In some areas, the water contains fluoride naturally, and here fluoridation is not carried out. Some people object to fluoridation, although tests have proved that instances of dental decay are fewer in areas where fluoride is present in drinking water.

flush verb to clear (a sewer) by sending water through it; **flush toilet** = toilet where the excreta are washed into the sewage system by flushing with water; compare CHEMICAL TOILET, EARTH CLOSET

fluvial or fluvatile adjective referring to rivers; **fluvial or fluvatile deposits** = sediments deposited by rivers

flux noun rate at which heat or energy or radiation flows; **heat flux** = flow of heat in heat exchange

fly noun 1 (a) small insect with two wings, often living in houses, flies can walk on the ceiling; flies can carry infection onto food (b) fly ash = fine ash which is carried in smoke and fumes from burning processes (which can be collected and used to make bricks); the cloud contained particles of fly ash 2 verb to move through the air

◇ **fly-tipper** noun person who dumps rubbish anywhere

◇ **fly-tipping** noun dumping of rubbish anywhere (and not at official rubbish dumps)

QUOTE fly-tipping is the worst side-effect of the construction boom, due to the total absence of government regulations

London Environment Alert

foam noun liquid filled with bubbles of air; detergent foam drifted along the river; foam plastic or plastic foam = plastic with bubbles blown into it, making a light material used for packing (CFCs are used in the manufacture of plastic foam)

focus noun point in the interior of the earth which is the centre of an earthquake; compare EPICENTRE

fodder noun plants such as grass, clover, dry hay, which are grown and given to animals as food

foehn *noun* warm dry wind which blows down the lee side of a mountain (it is caused when moist air rises up the mountain on the windward side, loses its moisture as precipitation and then goes down the other side as a dry wind; similar to CHINOOK)

fog *noun* thick mist made up of millions of tiny drops of water; **coastal fog** or **sea fog** = fog which forms along the coast or over sea, caused by cold air meeting relatively warmer water; **freezing fog** = fog formed of supercooled vapour droplets (i.e. droplets which remain liquid in the air, even though the temperature is below 0°C) which turn to ice when they touch a surface

◇ **foggy** *adjective* (weather) when there is fog; **foggy days are common in November**

COMMENT: fogs are caused by a fall in the temperature of damp air, making the moisture in the air condense into droplets. This can happen as cold air passes over warm sea water (advection fog), or when the air just above ground level is warmer in the evening than the ground beneath (radiation fog). Technically speaking, a fog occurs when visibility falls to below 1,000 metres. Above this, moisture in the atmosphere is called 'mist'. Different levels of fog thickness are classified as: aviation fog (where aircraft may not be able to land), thick fog (with visibility down to 200 metres, where road traffic is affected) and dense fog (visibility down to 50 metres, where it is not safe for any vehicles to move about)

foliage *noun* leaves (on plants); *in a forest, much of the rainfall is lost through evaporation from foliage surfaces*

◇ **foliar** *adjective* referring to leaves; **foliar feed** = liquid nutrient used by gardeners to spray onto the leaves of plants which then absorb it

food *noun* things which are eaten; **health food** = food with no additives or food consisting of natural cereals, dried fruit and nuts; **food allergies** = reactions caused by sensitivity to certain foods (some of the commonest being strawberries, chocolate, milk, eggs, oranges); **food chain** = series of organisms which pass energy from one to another as each provides food for the next (the first organism in the chain is a producer, all the rest are consumers); **food poisoning** = illness caused by eating food which is contaminated with bacteria; *the hospital had to deal with six cases of food poisoning; all the people at the party went down with food poisoning*; **food web** = series of food chains which are linked together in an ecosystem

◇ **foodstuffs** *noun* different types of food

COMMENT: two basic kinds of food chain exist: the grazing food chain and the detrital food chain in which plant-eaters and detritus-eaters participate. In practice, food chains are interconnected, making up food webs

footpath *noun* way along which people can walk on foot; *long-distance footpaths have been created through the mountain regions*

forage 1 *noun* food for cattle and other herbivores 2 *verb* to look for food; *the woodpecker forages in the forest canopy while searching for insects*

forecast 1 *noun* description of what will happen in the future; **weather forecast** = description of what the weather will be for a definite period in the future; **medium-range weather forecast** = forecast covering two to five days; **long-range weather forecast** = forecast covering a period more than five days ahead 2 *verb* to describe what will happen in the future

◇ **forecasting** *noun* describing what will happen in the future; **weather forecasting** = scientific study of weather conditions and patterns, which allows you to describe what the weather will be like over the next period of time

foreshock *noun* small shock which comes before a main earthquake shock; *see also AFTERSHOCK*

foreshore *noun* area of sand or pebbles which is only covered by the sea when there are very high tides

forest 1 *noun* (a) natural assembly of plants and animals, of which the dominant organisms are trees (a large area is a forest, a small area is a wood); *the forests of Germany are affected with Waldsterben; the whole river basin is covered with tropical forest; a virgin tropical forest is a very different ecosystem from the managed forests of Europe; forest fires are widespread in the dry season and can sometimes be started by lightning*; **high forest** = forest made up of tall trees which block the light to the forest floor; **mixed forest** = forest with more than one species of tree; **rain forest** = thick tropical forest which grows in regions where rainfall is very high; **the forest floor** = ground at the base of the trees in a forest (b) another name for what is really a plantation (trees and shrubs planted in rows, usually for commercial exploitation) 2 *verb* to manage a forest, by cutting wood as necessary, and planting new trees

◇ **forester** *noun* person who manages woods and plantations of trees

◇ **forestry** *noun* management of forests, woodlands and plantations of trees

QUOTE one of the most vital functions fulfilled by forests is the control of water runoff to rivers. In a well-forested watershed, 95% of the annual rainfall is trapped in the network of roots that underlies the forest floor. This water is then released slowly over the year, keeping streams and rivers flowing during the dry season. When the forest is removed, the rains rush down the denuded slopes, straight into the local streams and rivers, only 5% of the rainwater being absorbed into the soil

Ecologist

formation *noun* (a) act of taking a form or shape; way in which something is formed; *millions of years of warm damp climate led to the formation of coal seams* (b) cloud formation = shapes of clouds as seen from the ground

fossil *noun* remains of an ancient animal or plant found preserved in rock; **fossil fuels** = fuels (such as coal or oil) which are formed from the remains of plants in rock

◇ **fossilized** *adjective* (animal or plant) which has become a fossil

foul *adjective* dirty; **foul air** = air which has been circulated in a building or mine without being changed; **foul water** = water containing waste or sewage

fowl *noun* bird (especially a hen) raised on a farm for food; **fowl pest** = virus disease of chickens

Fr *chemical symbol* for francium

fraction *noun* component of a mixture separated out by a fractional process; *the fraction of petroleum which is a gas is natural gas*

◇ **fractional distillation** *noun* distillation process where different fractions are collected at different points during the process

fracture *noun* breaking of rock (as at a fault line)

fragile *adjective* easily broken or easily destroyed

francium *noun* natural radioactive element
NOTE: chemical symbol is **Fr**; atomic number is 8

free *adjective* not attached or not controlled; **free acceleration test** = test to analyse the exhaust fumes produced by a car or other vehicle, where the engine is accelerated while the vehicle is stationary, and samples of the exhaust fumes are collected; **free heat** = heat which is present in a building, coming not from heating but from appliances, people, heat kept in walls or floors, etc.; **free-living**

animal = animal which exists in its environment without being a parasite on another; **free range eggs** = eggs from hens that are allowed to run about in the open and eat more natural food (as opposed to battery hens); **free temperature rise** = difference in temperature between the temperature outside a building and the free heat inside it (if the building is well-insulated, it can be as much as 10°C)

freeze *verb* (a) (i) to make something very cold; (ii) to become very cold (b) to be so cold that water turns to ice; *it's freezing outside; they say it will freeze tomorrow*; **freezing fog** = fog formed from supercooled vapour droplets (i.e. droplets which are still liquid, even though the temperature is below 0°C) and which turn to ice when they touch a surface; **freezing level** = level of 0°C temperature in the atmosphere; **freezing point** = temperature (expressed in degrees Celsius) at which a liquid freezes; *the freezing point of water is 0°C*; compare MELT

◇ **freeze drying** *noun* method of preserving food by freezing rapidly and drying in a vacuum

freon *noun* trade name for chlorofluorocarbon or compound of chlorine carbon and fluorine used as a propellant in aerosol cans, as a coolant in refrigerators, for cleaning electronic devices and for making expanded plastic foam

frequency *noun* density or numbers of species in a certain area

fresh *adjective* (a) not used or not dirty; **fresh air** = open air; *they came out of the mine into the fresh air* (b) not tinned or frozen; *fresh fish is less fatty than tinned fish; fresh vegetables are expensive in winter*

◇ **fresh water** *noun* water in rivers and lakes which contains almost no salt (as opposed to salt water in the sea)

◇ **freshwater** *adjective* living in fresh water; *some freshwater fish such as pike can withstand certain levels of acidity*

friable *adjective* (soil) which is light or which crumbles easily into fragments

Friends of the Earth (FoE) *noun* pressure group formed to influence local and central governments on environmental matters

front *noun* line marking the point where two masses of air meet; **cold front** = front where a mass of cold air pushes away a mass of warm air from an area; **occluded front** = front where warm air and cold air masses meet and mix, with the warm air rising away from the surface of the ground; **warm front** = front where a mass of warm air pushes away a mass of cold air from an area

◇ **frontal** *adjective* referring to a front; **frontal system** = series of fronts which are linked together; **frontal wave** = movement of air at the edge of a warm front

frost *noun* freezing weather when the temperature is below the freezing point of water (it may lead to a deposit of crystals of ice on surfaces); *there was a frost last night*; **air frost** = condition where the air temperature is below 0°C, but not at ground level; **ground frost** = condition where the air temperature at ground level is below 0°C; **a hard frost** = weather when the temperature falls well below freezing point; **hoar frost** = frozen dew which forms on outside surfaces when the temperature falls below freezing point; **frost hollow** or **frost pocket** = low-lying area where cold air collects and frosts are frequent; **frost point** = temperature at which moisture which saturates air becomes ice

◇ **frosty** *adjective* (weather) when the air temperature is below zero

frostbite *noun* injury caused by very severe cold which freezes tissue

◇ **frostbitten** *adjective* suffering from frostbite

COMMENT: in very cold conditions, the outside tissue of the fingers, toes, ears and nose can freeze, becoming white and numb. Thawing of frostbitten tissue can be very painful and must be done very slowly

fruit *noun* (i) ripe ovary of a plant and its contents of seeds; (ii) in general usage, the fleshy material round the fruit which is eaten as food; *a diet of fresh fruit and vegetables*; **fruit fly** = a fly which attacks fruit NOTE: no plural when referring to the food; *you should eat a lot of fruit* **2 verb** (of a tree) to have fruit; *some varieties of apple fruit very early*; *the drought has damaged fruiting trees*; *the fruiting season* = time of year when a particular tree has fruit

◇ **fruitwood** *noun* wood from a fruit tree (such as apple or cherry) which may be used to make furniture

COMMENT: fruit contains fructose which is a good source of vitamin C and some dietary fibre. Dried fruit have a higher sugar content but less vitamin C than fresh fruit

fuel *noun* substance (such as wood or coal or gas or oil) which can be burnt to provide heat or power; **fuel efficiency** = percentage of heat from burning a fuel; **fuel element** = piece of nuclear fuel in a reactor; **fuel oil** = petroleum oil used as fuel in domestic heating boilers; **fuel rod** = piece of nuclear fuel, in the form of a rod, placed in the core of a nuclear reactor; **fossil fuel** = fuel such as coal or oil, which is formed of fossilized plant matter; **nuclear fuel**

= substance which is fissile (such as uranium-238) and can be used to create a controlled reaction in a nuclear reactor; **solid fuel** = coal or coke or wood; **solid fuel heating** = heating which is provided by burning solid fuels **2 verb** to use as a fuel; *the boilers are fuelled by natural gas*

◇ **fuelwood** *noun* wood which is grown to be used as fuel

QUOTE over 200,000 woodstoves have been sold in the UK, and the fuelwood market is estimated at 250,000 tonnes per annum
Environment Now

fumarole *noun* small hole in the earth's crust near a volcano from which gases or smoke or steam are released

fumes *plural noun* (a) gas or vapour; **toxic fumes** = poisonous gases or smoke given off by a substance (b) solid particles produced by a chemical reaction which pass into the air as smoke

fumigate *verb* to kill germs or insects by using fumes

◇ **fumigation** *noun* (a) killing germs or insects by applying pesticides in the form of fumes (b) high amount of air pollution near the ground, caused when the morning sun heats the air and forces polluted air from higher levels down to the ground

◇ **fumigant** *noun* chemical compound which is heated and becomes volatile, used to kill insects

fungus *noun* simple plant organism with thread-like cells (such as yeast, mushrooms, mould) and without green chlorophyll; **fungus disease** = disease caused by a fungus; **fungus poisoning** = poisoning by eating a poisonous fungus NOTE: plural is **fungi**. For other terms referring to fungi, see words beginning with **myc-**

◇ **fungus** *adjective* referring to fungi; *he had a fungal skin infection*

◇ **fungicidal** *adjective* (paint) which kills fungi

◇ **fungicide** *adjective & noun* (substance) used to kill fungi

◇ **fungoid** *adjective* like a fungus

COMMENT: some fungi can become parasites of animals and cause diseases such as thrush. Other fungi, such as yeast, react with sugar to form alcohol. Some antibiotics (such as penicillin) are derived from fungi

fur *noun* (a) coat of hair, covering an animal; *the rabbit has a thick coat of winter fur* (b) skin and hair of an animal, used to make clothes; *she wore a fur coat and fur gloves*

COMMENT: trapping of wild animals for their fur is considered cruel by many people. Artificial fur can be used as an alternative. Some native peoples, such as Eskimos, need to kill animals both for food and for their skins, so a total ban on killing is not practicable

furnace *noun* container for burning fuel and ore; **blast furnace** = furnace for producing iron or copper from ore, in which the ore, coke and limestone are heated together and air is blown through the burning mixture

furrow *noun* long trench and ridge cut in the soil by a plough

fuse *verb* to join together to form a whole

◇ **fusion** *noun* joining together of nuclei to form a single large nucleus, creating energy

COMMENT: fusion is the opposite process to fission, which is currently used in all nuclear power stations. Fusion is used to create bombs such as the hydrogen bomb, and research is being carried out into ways of using it in power stations

Gg

G *abbreviation for giga-*

Gaia theory *noun* theory that the biosphere is like a single organism where the living fauna and flora of the earth, its climate and geology, all function together and are interrelated, influencing the development of the whole environment

gale *noun* very strong wind (force 8 on the Beaufort scale), usually blowing from a single direction; *gales are forecast for the areas; two oaks were blown down in the October gales*

galena *noun* ore (lead sulphide) from which lead is produced

gall *noun* hard growth on a plant caused by a parasitic insect

game *noun* animals which are killed for sport (and food); **big game** = large wild animals (such as elephants, tigers, etc.) which are killed for sport

NOTE: no plural

◇ **gamekeeper** *noun* person working on a private estate who protects wild birds and animals bred to be hunted

◇ **game warden** *noun* person who protects big game for photographers or for hunters

gamete *noun* sex cell, in animals a spermatozoon and an ovum, in plants the pollen and an ovule

◇ **gametocide** *noun* drug which kills gametocytes

◇ **gametocyte** *noun* cell which develops into a gamete

gamma *noun* third letter of the Greek alphabet

◇ **gamma radiation** *noun* radiation from gamma rays

◇ **gamma rays** *noun* rays which are shorter than X-rays and are given off by radioactive substances

COMMENT: gamma rays form part of the high energy radiation which the earth receives from the sun. Gamma rays are also given off by radioactive substances and can penetrate very thick metal

garbage *noun* rubbish or household waste

garden *noun* land cultivated as a hobby or for pleasure, rather than to produce an income; **flower garden** = garden where only flowers are grown; **kitchen garden** = garden with herbs and small vegetables, ready for use in the kitchen; **market garden** = farm near a town, providing fresh vegetables and salad crops for sale in the town's market; **garden city** or **garden suburb** = town planned in the early 20th century on farmland near a large town, with gardens (both public parks and private gardens round each house), the aim being to mix the urban and rural environments

◇ **gardener** *noun* person who looks after a garden

◇ **gardening** *noun* horticulture or looking after a garden

gas *noun* (a) substance intermediate between a liquid and a solid, which will completely fill a container it occupies; *heating turned the liquid into a gas; if a gas is cooled it will become liquid*; **gas-cooled reactor** = nuclear reactor in which carbon dioxide or helium are heated to very high temperatures and then passed into water tanks to create steam; **gas exchange** = transfer of gases between an organism and its environment; **gas mask** = protective covering for the face, where air and poisonous gas is filtered through a charcoal filter which extracts the poison; **gas poisoning** = poisoning by breathing in carbon monoxide or other toxic gas (b) substance often produced from coal or found underground and used to cook or heat; *a gas cooker; we heat our house by gas*; **natural gas** = gas (usually methane and its compounds) found underground and brought to towns for domestic use; **town gas** = manufactured gas made from coal; **gas turbine** = aircraft engine, where gas from burnt fuel is blown under pressure to turn turbine blades (c) **US gasoline**, liquid derived from petroleum and used as fuel for car engines

◇ **gaseous** *adjective* formed of gas; **gaseous pollutants** = pollutants in the form of gas

◇ **gasification** *noun* process of converting coal into gas to be used as fuel in gas-fired power stations

◇ **gasifier** *noun* factory which can convert coal into gas to be used as fuel

◇ **gasoline** *noun* **US** petrol, liquid derived from petroleum, used as a fuel for car engines

gastr- *prefix* referring to the stomach

◇ **gastric** *adjective* referring to the stomach; **gastric acid** = hydrochloric acid secreted into the stomach by acid-forming cells; **gastric juices** = mixture of hydrochloric acid, pepsin, intrinsic factor and mucus secreted by the cells of the lining membrane of the stomach to help the digestion of food

◇ **gastroenteritis** *noun* inflammation of the membrane lining the intestines and the stomach, caused by a viral infection and resulting in diarrhoea and vomiting

Geiger counter *noun* instrument for detection and measurement of radiation

COMMENT: a Geiger counter is made of a tube (forming a negative electrode) filled with argon, with a wire running through the centre which forms the positive electrode. The presence of radiation causes a discharge of electricity between the electrodes which creates an audible pulse which is used as a measure of the radiation: the greater the frequency of the pulses, the higher the level of radiation

gene *noun* unit of DNA on a chromosome which governs the synthesis of one protein, usually an enzyme, and determines a particular characteristic of an organism; **gene bank** = collection of seeds from potentially useful wild plants, which may be used in the future for breeding new varieties; *see* GENETIC

COMMENT: genes are either dominant, when the characteristic is always passed on to the offspring, or recessive, when the characteristic only appears if both parents have contributed a recessive gene

genera *see* GENUS

generalist *noun* (a) species which can live in many different environments (b) person who studies many different subjects, rather than specializing in one

generate *verb* to make something exist; *carbon monoxide is generated by car engines; the nuclear reaction generates a huge amount of heat*

◇ **generator** *noun* device which produces electricity or other forms of power

QUOTE in a biogas generator, organic material such as weeds or manure are fermented by bacteria in a tank. This produces a sludge that can be used for fertilizer and biogas that can be used for heating and lighting

New Scientist

QUOTE nearly 80% of Britain's electricity is generated in coal-fired power stations. Of the rest, some 17% is generated by nuclear power stations, at those times when they are not out of commission, and a mere 2% by hydroelectricity

Ecologist

COMMENT: in a power station, various forms of fuel are used to create steam to turn turbines. The turbines turn a central shaft (the rotor) surrounded by a casing (the stator). Both rotor and stator are covered with windings of wire, and the electricity is generated by the movement of the shaft inside the casing

generation *noun* group of individual organisms which usually have derived from the same parents, leading back to a common ancestor

generic *adjective* referring to a genus; **generic name** = the name of a genus

COMMENT: organisms are usually identified by using their generic and specific names, e.g. *Homo sapiens* (man) and *Felix catus* (domestic cat). The generic name is written or printed with a capital letter. Both names are usually given in italics, or are underlined if written or typed

genet *noun* (i) an individual organism which is genetically different from others; (ii) a clone from such an individual organism

genetic *adjective* referring to the genes; *breeders of new crop plants are dependent on genetic materials from wild forms of maize and wheat*; **genetic code** = information which determines the synthesis of a cell, is held in the DNA of a cell and is passed on when the cell divides; **genetic engineering** = techniques used to change the genetic composition of an organism so that certain characteristics can be created artificially

◇ **genetics** *noun* study of the way the characteristics of an organism are inherited through the genes

QUOTE the emergent field of genetic engineering by which science devises new variations of life forms, does not render wild genes useless. This new science must be based on existing genetic material and makes such material more valuable

Brundtland Report

-genic *suffix* produced by or which produces;
photogenic = produced by light or which produces light

genome *noun* (i) all the genes in an individual; (ii) set of genes which are inherited from one parent

genotype *noun* genetic composition of an organism

genus *noun* group of closely-related species, the members of which are more closely related to each other than they are to members of other genera (several genera form a family)
 NOTE: plural is **genera**

geo- *prefix* referring to the earth

◇ **geochemistry** *noun* science which studies the chemical composition of the earth

◇ **geocline** *noun* changes that take place in the a species across different geographical environments

◇ **geodesy** *noun* science of the measurement of the earth or of very large sections of it

◇ **geodetic** *adjective* referring to geodesy;
geodetic surveys employ precise observations of angles and distances to determine the exact location of points on the earth's surface

geography *noun* science of studying the earth's surface, its climate, its physical features, etc.

◇ **geographer** *noun* person who specializes in the study of the earth

◇ **geographical** *adjective* referring to geography

geology *noun* scientific study of the composition of the earth's surface and its underlying strata; **economic geology** = study of rock or soil formation for the purpose of commercial mineral extraction

◇ **geological** *adjective* referring to geology

◇ **geologist** *noun* scientist who studies the earth's surface and its underlying strata

geomagnetic *adjective* referring to the earth's magnetic field; **geomagnetic poles** = the magnetic North and South poles to which a compass points (they are the centre of the earth's magnetic field and are close to, but not identical with, the North and South Poles)

◇ **geomagnetism** *noun* study of the earth's magnetic field

geomorphology *noun* study of the physical features of the earth's surface, their development and how they are related to the core beneath

geophysics *noun* scientific study of the physical properties of the earth

◇ **geophysicist** *noun* scientist who studies the physical properties of the earth

geophone *noun* sensitive device which records sounds of seismic movements below the earth's surface

geosphere *noun* central part of the earth, which contains no living organisms (as opposed to the atmosphere, the biosphere and the hydrosphere)

geostrophic wind *noun* wind which blows horizontally along the isobars, across the surface of the earth

geosyncline *noun* long fold in the earth's crust, forming a basin filled with a sediment of volcanic rocks

geothermal *adjective* referring to heat from the interior of the earth; **geothermal energy** or **geothermal power** = energy produced from the heat inside the earth (such as the energy in hot springs)

◇ **geothermally** *adverb* from geothermal sources; *geothermally heated water can be used for domestic heating*

COMMENT: apart from channelling water from hot springs, geothermal energy can also be created by pumping cold water into deep holes in the ground at points where hot rocks lie relatively close to the surface. The water is heated and becomes steam which returns to the surface and is used for domestic heating. See also HOT ROCKS

germ *noun* (a) part of an organism which develops into a new organism; **germ cell** = gamete or cell which is capable of developing into a spermatozoon or ovum (b) microbe (such as a virus or bacterium) which causes a disease; **germs** are not visible to the naked eye; **germ warfare** = biological warfare or war where one side tries to kill or affect the people of the enemy side by infecting them with bacteria NOTE: in this sense germ is not a medical term

germinate *verb* (of a plant seed or spore) to start to grow

◇ **germination** *noun* starting to grow

gestation *noun* period when a female animal has living young in her uterus

geyser *noun* phenomenon which happens when hot water and steam are sent out of a hole in the ground at regular intervals

COMMENT: geysers (such as Old Faithful in Yellowstone National Park in the USA) are caused when water deep below the earth's surface is heated to steam, and rises rapidly up the pipe leading to the surface, pushing the water already in the channel up with it

giga- prefix meaning one thousand million; **gigawatt (GW)** = one thousand million watts; **gigawatt-hour (GWh)** = one thousand million watts of electricity used for one hour; **air-conditioning accounts for one-third of the 500GW peak demand in the USA**

gills *noun* (a) breathing apparatus of fish and other animals living in water (a series of layers of tissue which extract oxygen from water as it passes over them) (b) series of thin leaf-like structures on the underside of the cap of a fungus, carrying the spores

glacier *noun* (i) mass of ice moving slowly across land, like a frozen river; (ii) large amount of stationary ice covering land in the arctic regions

◇ **glacial** *adjective* referring to glaciers; **the rocks are marked by glacial action**; **glacial climatologist** = scientist who studies climate as recorded in the ice of glaciers; **glacial deposits** = sand or soil or gravel deposited by a glacier; **glacial drift** = sediments deposited by glaciers; **glacial striations** = scratches made on rocks by moving glaciers

◇ **glaciation** *noun* (i) formation of glaciers; (ii) formation of ice crystals at the top of a rain cloud

◇ **glaciology** *noun* study of glaciers

◇ **glaciologist** *noun* scientist who specializes in the study of glaciers

COMMENT: during the Ice Ages, glaciers covered large parts of the Northern hemisphere, depositing sands in the form of glacial moraines and boulder clay. Glaciers are still found in the highest mountain areas, and in the Arctic and Antarctic regions

glaucoma *noun* condition of the eyes, caused by abnormally high pressure of fluid inside the eyeball, resulting in disturbances of vision and blindness

glaze *noun* = BLACK ICE

glen *noun* (in Scotland) long narrow mountain valley with a stream running along it

gley *noun* thick rich soil found in waterlogged ground

◇ **gleyed soil** *noun* soil which is waterlogged

globe *noun* the earth, seen as a large ball
◇ **global** *adjective* referring to the whole earth; **global temperatures will rise over the next fifty years**

QUOTE fossil fuel power plants and internal combustion engines throw millions of tons of carbon, sulphur dioxide and nitrogen oxides into the air each year, contributing to air pollution, acid rain and global warming

Greenpeace

QUOTE climatologists now predict that the combined effect of deforestation and the burning of fossil fuels will cause levels of carbon dioxide in the atmosphere to double, bringing about a 2 or 3 degree rise in global temperatures. Rising global temperatures could completely alter the face of the earth.

Ecologist

globule *noun* round drop (of oil or fat)

gloom *noun* dark and miserable weather; **anticyclonic gloom** = darkness during daytime when low stratocumulus clouds form at the approach of an anticyclone

gneiss *noun* rough rock with layers of different minerals

gob *noun* waste matter from coal processing plants which use bituminous coal; **see also CULM**

gold *noun* heavy yellow metal, used in jewellery

NOTE: chemical symbol is **Au**; atomic number is 79

gorge *noun* narrow valley with steep sides

gr = GRAIN

graben *noun* form of rift valley, made where land between fault lines has sunk

gradient *noun* angle of a slope; **plant roots cannot retain the soil on very steep gradients**; **temperature gradient** = gradual increase in temperature as you travel from the north or south poles towards the equator

graft 1 *noun* piece of plant or animal tissue transplanted onto another plant or animal and growing there **2** *verb* to transplant a piece of tissue from one plant or animal to another

COMMENT: many cultivated plants are grafted. The piece of tissue from the original plant (or scion) is placed on a cut made in the outer bark of the host plant (the stock) so that a bond takes place. The aim is usually to ensure that the hardy qualities of the stock are able to benefit the weaker cultivated scion

grain *noun* (a) cereal crop, such as corn, of which the seeds are dried and eaten (b) size of crystals in a rock; size of particles of sand (c) measure of weight equal to .0648 grams

NOTE: when used with numbers, **grain** is usually written **gr**

gram *noun* measure of weight; *a thousand grams make one kilogram; I need 5g of morphine*

NOTE: when used with numbers, **gram** is usually written **g**: 50g

-gram *suffix* meaning a record in the form of a picture; **cardiogram** = X-ray picture of the heart

Graminales *noun* the grasses, a very large family of plants including cereals such as wheat, maize, etc.

granite *noun* hard grey rock with pieces of quartz, feldspar and other minerals in it

granular *adjective* like grains

◇ **granule** *noun* small particle or grain of a mineral

graph *noun* diagram which shows the relationship between different quantities; **temperature graph** = graph showing how the temperature rises and falls

-graph *suffix* meaning a machine which records by drawing

◇ **-grapher** *suffix* meaning a person skilled in a subject or a technician who operates a machine which records

◇ **-graphy** *suffix* meaning the process of drawing

graphite *noun* mineral form of carbon occurring naturally as crystals or as a soft black deposit (used as a moderator in certain types of nuclear reactor, and is mixed with clay to make lead pencils)

grass *noun* flowering monocotyledon of which there are a great many genera, including wheat, barley, rice, oats, an important food for herbivores and humans; *see also* GRAMINALES

◇ **grassland** *noun* land covered by grasses, especially wide open spaces such as the prairies of North America or the pampas of South America

QUOTE the first problem for the pasture agronomist is to find a grass that can produce dense ground cover quickly. Legumes must not compete too much with the grass because cows prefer to eat grasses

New Scientist

gravel *noun* sand and small pebbles occurring as deposits (on the Wentworth-

Udden scale, gravel has a diameter of between 2 and 4 millimetres)

graveyard *noun* place where nuclear waste is buried

gravity *noun* force of nature by which bodies are attracted to each other; **the earth's gravity** = the natural force which attracts bodies to fall to the ground

◇ **gravitational** *adjective* referring to gravity; **gravitational field** = area of space in which gravity is felt; **tides are caused by the moon's gravitational pull**

gray *noun* SI unit of measurement of absorbed radiation

graze *verb* (of animals) to feed on grass

◇ **grazier** *noun* farmer who looks after grazing animals

◇ **grazing** *noun* (a) action of feeding animals on growing grass; **grazing food chain** = food chain in which the energy in vegetation is eaten by animals, digested, then passed into the soil as dung and so taken up again by plants which are eaten by animals, etc. (b) land covered with grass, suitable for animals to feed on; **there is good grazing on the mountain pastures**

green *adjective & noun* (a) of a colour like the colour of leaves; **the green colour in plants is provided by chlorophyll**; **green algae** = algae which contain chlorophyll; **green manure** = rapid-growing green vegetation (such as mustard plants or rape) which is grown and ploughed into the soil to rot and act as manure (b) referring to an interest in ecological and environmental problems; **green consumerism** = movement to encourage people to buy food and other products which are environmentally good (such as organic foods, lead-free petrol, etc.); **Green Party** or **the Greens** = political party which is mainly concerned with environmental issues; **green politics** = political proposals put forward by environmentalists

Green Belt *noun* area of agricultural land or woodland or parkland which surrounds an urban area

COMMENT: Green Belt land is protected, and building is restricted and often prohibited completely. The aim of setting up a Green Belt is to prevent urban sprawl and reduce city pollution

greenfield site *noun* fields which are chosen as the site for a new housing development or factory; **urban fringe sites are less attractive to developers than greenfield sites**

greenhouse *noun* building made mostly of glass, used to raise and protect plants;

greenhouse effect = effect produced by the accumulation of carbon dioxide crystals and water vapour in the upper atmosphere, which insulates the earth and raises the atmospheric temperature by preventing heat loss. Chlorofluorocarbons also help create the greenhouse effect; **greenhouse gases** = gases (carbon dioxide, methane, CFCs and nitrogen oxides) which are produced by burning fossil fuels and which rise into the atmosphere, preventing heat loss

QUOTE in the next 40 or 50 years, the greenhouse gases in the atmosphere will double and the world will get warmer by between 1 and 4.5°C

Guardian

QUOTE in general, a temperature rise will decrease the time available for the specific phases of cereal crops from leaf growth through to reproduction. Yields will probably decrease as temperatures increase. But more CO₂ will put yields up and if temperature and CO₂ were the only factors, output from most crops would not change much.

Farmers Weekly

COMMENT: carbon dioxide particles allow solar radiation to pass through and reach the earth, but prevent heat from radiating back into the atmosphere. This results in a rise in the earth's atmospheric temperature, as if the atmosphere were a greenhouse protecting the earth. Even a small rise of less than one degree Celsius in the atmospheric temperature could have serious effects on the climate of the earth as a whole. The temperature over the poles would rise, melting the polar ice caps and causing sea levels to rise everywhere. This would cause permanent flooding in many parts of world. In addition, temperate areas in Asia and America would experience hotter and drier conditions, causing crop failures. Carbon dioxide is largely formed from burning fossil fuels; other gases contribute to the greenhouse effect, for instance, methane is increasingly produced by rotting vegetation in swamps, from paddy fields, from termites' excreta and even from the stomachs of cows. There is an opposite effect to the greenhouse, which is the cooling of the earth's atmosphere caused by the dust veil, a mass of particles of dust which circulates in the upper atmosphere and prevents solar radiation from passing through to the earth's surface.

Greenpeace *noun* international pressure group, which takes physical action to prevent the pollution of the environment

Green Revolution *noun* development of new forms of cereal plants such as wheat and rice and the use of more powerful fertilizers, which give much higher yields and increase

the food production especially in tropical countries

QUOTE in Asia, the Green Revolution, which featured high-input, high-yield agricultural technology, heralded a remarkable increase in grain production to the point that India and Pakistan became self-sufficient having formerly been large importers

Appropriate Technology

grid *noun* (a) series of crossing lines which form regular squares, used on maps; **grid reference** = numbers which refer to a point on a map, used for accurate location of places (b) **National Grid** = system for carrying electricity round a country, using power lines from various power stations (the electricity is at a high voltage, which is reduced by transformers to low voltage by the time the electricity is brought into use)

grit *noun* (a) sharp grained sand (b) tiny solid particle in the air, larger than dust

groove *noun* long shallow depression in a surface

gross *adjective* total or with no deductions; **gross domestic product** = annual value of goods sold and services paid for inside a country; **gross national product** = annual value of goods and services in a country including income from other countries; **gross productivity** = rate at which energy is produced by plants through photosynthesis, before the plant uses any of the energy itself

ground *noun* (a) surface layer of soil or earth; **ground frost** = condition where the air temperature at ground level is below 0°C; **ground moraine** = deposit of gravel and sand left under a glacier; **ground water** = water which stays in the top layers of soil or in porous rocks and can collect pollution (as opposed to surface water which drains away rapidly, and leaches pollutants from the surface) (b) area; **breeding grounds** = area where birds or animals come each year to breed; **wintering grounds** = area where birds come each year to spend the winter

group 1 *noun* (a) several people or animals or things which are all close together (b) way of putting similar things together; **blood group** = type of blood; **age group** = all people of a certain age 2 *verb* to bring together in a group; **blood grouping** = classifying people according to their blood groups

grow *verb* (a) to become taller or bigger; *the tree grows a new ring each year; he grew three centimetres in one year; growing point* = point on the stem of a plant where growth occurs (often at the tip of the stem or branch); **growing season** = period of the year when a plant grows; *alpine plants have a short growing*

season (b) to become; it's growing colder at night now; she grew weak with hunger

◇ **growth** *noun* increase in size; amount by which something increases in size; *the disease stunts the conifers' growth; the growth in the population since 1960; the rings shows the annual growth of the tree; growth promoter* = substance which makes a plant or animal grow; *growth retardant* = substance used to slow or stop the growth of a plant; *growth rings* = rings seen in the cross-section of the trunk of a felled tree, each one added during a single year; *see also ANNUAL RINGS*

groynes *noun* breakwater which is built into the sea at right angles to the shoreline in order to prevent erosion

grub **1** *noun* small caterpillar or larva **2** *verb* to **grub up** = to dig up a plant with its roots; *miles of hedgerows have been grubbed up to make larger fields*

guano *noun* mass of accumulated bird droppings, found especially on small islands in the sea, gathered and used as fertilizer

guide **1** *noun* person or book which shows you how to do something or what to do; *read this guide to services offered by the local authority* **2** *verb* to show someone where to go or how to do something

◇ **guidelines** *noun* general rules laid down by a government telling people how something

should be done; *the minister has issued guidelines for the planning of inner cities*

guild *noun* group of plants or animals of the same species which live in the same type of environment

gulf *noun* very large area of sea enclosed partly by land

◇ **Gulf Stream** *noun* current of warm water in the Atlantic Ocean which flows north along the east coast of the USA, then crosses the Atlantic and hits northern Europe

◇ **gulfwed** *noun* weed which floats and grows in the Sargasso Sea

gully *noun* small channel for water (such as an artificial channel dug at the edge of a field or a natural channel in rock); **gully cleaning** = clearing rubbish from drainage gullies at the edge of roads

gust **1** *noun* sudden violent wind or wind and rain **2** *verb* (of wind) to blow suddenly; *the met office is forecasting winds gusting to 90 miles per hour*

◇ **gusty** *adjective* (wind) blowing in gusts

Gutenberg discontinuity *noun* boundary between the mantle and the core inside the earth

GW or gW = GIGAWATT

Hh

H *chemical symbol for hydrogen*

ha = HECTARE

haar *noun* sea mist occurring during the summer in the north of the British Isles

habit *noun* way in which a plant grows; *a bush with an erect habit or with a creeping habit*

habitat *noun* type of environment in which an organism lives

QUOTE because of its strange topography the area is richly endowed with contrasting habitats: bare rock and grassland, vine thickets and savanna

New Scientist

QUOTE throughout India, elephant habitat is suffering encroachment by coffee and tea plantations

BBC Wildlife

haematite *noun* an iron oxide (Fe_2O_3), the most common form of iron ore

haemoglobin (Hb) *noun* red respiratory pigment containing iron in red blood cells which gives blood its red colour; *see also* CARBOXYHAEMOGLOBIN

COMMENT: haemoglobin absorbs oxygen in the lungs and carries it in the blood to the tissues. Haemoglobin is also attracted to carbon monoxide and readily absorbs it instead of oxygen, causing carbon monoxide poisoning

hail 1 *noun* water falling from clouds in the form of small round pieces of ice **2** *verb* to fall as small pieces of ice

◇ **hailstones** *noun* pieces of ice which fall from clouds like rain

◇ **hailstorm** *noun* storm, where the precipitation is hail and not rain

COMMENT: hail occurs when rain forms in cumulonimbus clouds and is carried upwards into colder air where it freezes. It then falls back through the cloud, growing in size as it accumulates moisture

half-hardy *adjective* (garden plants) which can stand a certain amount of cold

half-life *noun* time taken for half the atoms in a radioactive isotope to decay

COMMENT: radioactive substances decay in a constant way, and each has a different half-life: strontium-90 has a half-life of 28 years, radium-226 one of 1,620 years, and plutonium-239 has a half-life of 24,360 years

halo *noun* circle of light seen round the sun or moon as rain approaches; *compare* CORONA

halo- *prefix* meaning salt

◇ **halobiotic** *adjective* (organism) which lives in salt water

◇ **halocline** *noun* line where two masses of water meet, as between a mass of fresh water and the sea

◇ **halogen** *noun* one of a series of chemically-related elements (fluorine, chlorine, iodine, bromine and astatine)

◇ **halomorphic soil** *noun* soil which contains large amounts of salt

◇ **halophile** *noun* freshwater species which can also live in salt water

◇ **halophyte** *noun* plant which lives in salty soil

hanging valley *noun* valley formed when a glacier flows into a larger glacier

COMMENT: hanging valleys are the result of glaciation. The main valley has been cut deeper by the large glacier, leaving the smaller valley to join it at a cliff; this is one of the ways in which waterfalls are formed

hard *adjective* (a) not soft; *a diamond is one of the hardest minerals; granite is a very hard stone; hard water* = tap water which contains a high percentage of calcium and magnesium, which makes it difficult for soap to lather and also causes deposits in pipes and kettles (b) difficult; *it is hard for grazing animals to find enough to eat in drought conditions* (c) a hard winter = a very cold winter; *in a hard winter, many smaller birds may be killed*

◇ **harden** *verb* to make hard or to become hard; *to harden off* = to make plants become gradually more used to cold; *after seedlings have been grown in the greenhouse, they need to be hardened off before planting outside in the open ground; cold hardening* = the process by

which a conifer prepares for the winter by reducing the amount of water contained in its needles

◇ **hardness** *noun* (a) way of showing the percentage of calcium in water. (Water hardness is permanent if it remains after the water has been boiled (this is caused by calcium and magnesium). Temporary hardness is caused by carbonates of calcium and can be removed by boiling the water) (b) measurement of how hard a mineral is

COMMENT: hardness of minerals is shown on a scale of 1 to 10: diamond is the hardest (i.e. it has hardness 10) and talc is the softest. A mineral of one grade is able to scratch or mark a mineral of the grade below

hardpan *noun* hard soil surface, usually formed of dried clay

◇ **hardwood** *noun* slow-growing broad-leaved tree (such as oak or teak) which produces a hard wood with a fine grain; **hardwoods** = forests of hardwood trees; compare **SOFTWOOD**

◇ **hardy** *adjective* (plant or animal) which can withstand the cold; see also **HALF-HARDY**

harmattan *noun* hot dry winter wind which blows from the north-east and causes dust-storms in the Sahara

harness *verb* to control a natural phenomenon and make it produce energy; a tidal power station harnesses the power of the tides

harrow 1 *noun* farm implement, made of a series of spikes which is dragged across the surface of ploughed soil to level it 2 *verb* to level the surface of ploughed soil, covering seeds which have been sown in furrows

harvest 1 *noun* (i) time when a crop is gathered; (ii) crop which is gathered; *we think this year's rice harvest will be a good one* 2 *verb* to gather a crop which is ripe; *they are harvesting the rice crop; clearcutting is one of the methods of harvesting timber*

hatch *verb* (of an animal in an egg) to become mature and break out of the egg

hay *noun* grass mowed and dried before it has flowered

◇ **haymaking** *noun* cutting grass in fields to make hay

COMMENT: hay is cut before the grass flowers; at this stage in its growth it is a nutritious fodder. If it is mowed after it has flowered it is called straw, and is of much less use as a food, and so is used for bedding

hay fever *noun* inflammation in the nose and eyes caused by an allergic reaction to flowers, their pollen and scent, and to dust; *when he has hay fever, he has to stay indoors; the hay fever season starts in May*

COMMENT: hay fever is an allergic reaction to pollen or fungus spores in the atmosphere. Tree pollen is most prevalent in spring, followed by the pollen of flowers and grasses during the summer months and fungal spores in the early autumn. The grains of pollen enter the nose and eyes and chemicals in them irritate the mucus and produce histamine

hazard *noun* risk or danger; *stagnant water poses a health hazard*

◇ **hazardous** *adjective* risky or dangerous; **hazardous waste** = rubbish which can pose a risk to people's health

QUOTE some 2.3 million tonnes of hazardous waste were transported for disposal in another country in 1983

Guardian

haze *noun* dust suspended in the atmosphere which reduces visibility; **heat haze** = reduction in visibility caused by warm air rising from the ground

Hb = HAEMOGLOBIN

He *symbol* for helium

head *noun* point where a river starts to flow

◇ **headland** *noun* (a) high mass of land sticking into the sea (b) area of soil at the edge of a field (where the tractor turns when ploughing)

◇ **headstream** *noun* stream which flows into the river near its head

health *noun* being well or not being ill; state of being free from physical or mental disease; *the council said that fumes from the factory were a danger to public health; all cigarette packets carry a government health warning; Health and Safety at Work Act* = Act of Parliament which rules how the health of workers should be protected by the companies they work for; **Environmental Health Officer (EHO)** or **Public Health Inspector** = official of a local authority who examines the environment and tests for air pollution or bad sanitation or noise levels, etc.; **health education** = teaching people (school children and adults) to do things to improve their health, such as taking more exercise, stopping smoking, etc.

◇ **healthy** *adjective* (i) well or not ill; (ii) likely to make you well; *being a farmer is a healthy job; people are healthier than they were fifty years ago; this town is the healthiest place in England; if you eat a healthy diet and take*

plenty of exercise there is no reason why you should fall ill

heartwood *noun* hard dead wood in the centre of a tree's trunk which helps support the tree; *compare* SAPWOOD

heat 1 *noun* being hot or energy which is moving from a source to another point; *the heat of the sun made the surface of the road melt*; **heat balance** = state in which the earth loses as much heat by radiation and reflection as it gains from the sun, making the earth's temperature constant from year to year; **heat engine** = phenomenon which produces the earth's climatic pattern, caused by the difference in temperature between the hot equatorial zone and the cold polar regions, making warm water and air from the tropics move towards the poles; **heat exchanger** = device which transfers heat from one source to another (as in a heating system where a hot pipe goes through a water tank to heat it); **heat exhaustion** = collapse due to overexertion in hot conditions; **heat flow** = movement of heat (as through a metal or from the earth into space); **heat loss** = loss of heat (as through inadequate insulation); **heat pump** = device which cools or heats by transferring heat from cold areas to warm ones (used in refrigerators or for heating large buildings); **heat recovery** = collecting heat from substances heated during a process and using it to heat further substances, so as to avoid heat loss 2 *verb* to make hot; *the solution should be heated to 25°C; in the sun, the soil surface can heat to 60°C*

heath *noun* area of dry sandy acid soil with low shrubs such as heather and gorse growing on it

◇ **heathland** *noun* wide area of heath

heavy *adjective* which weighs a lot; **heavy metals** = metals such as lead, cadmium and zinc which have a high atomic number and which, if present in soil, have a stunting effect on plants; **heavy water** = deuterium oxide (D₂O), water containing deuterium instead of the hydrogen atom, used as a moderator in certain types of nuclear reactor such as the CANDU; **heavy hydrogen** = deuterium

QUOTE the government agreed to reduce by 50% its discharges into the North Sea of heavy metals such as cadmium, iron, lead zinc and arsenic

New Scientist

hectare *noun* area of land measuring 100 by 100 metres, i.e. 10,000 square metres or 2.47 acres

NOTE: usually written **ha** after figures; **2,500 ha**

hedge *noun* row of bushes planted and kept trimmed to provide a barrier around a field

◇ **hedgelaying** *noun* traditional method of cultivating hedges, where tall saplings are cut through half way and then bent over so that they lie horizontally and make a thick barrier

◇ **hedgerow** *noun* line of bushes forming a hedge

◇ **hedging** *noun* art of cultivating hedges

COMMENT: it is said that you can judge the age of a hedge by counting the species in it and multiplying by 100; the more species there are, the older the hedge is

helio- *prefix* meaning sun

◇ **heliophyte** *noun* plant which prefers to grow in sunlight

helium *noun* light inert gas, used in balloons and as a coolant in some types of nuclear reactor

NOTE: chemical symbol is **He**; atomic number is 2

hemisphere *noun* half of a sphere; one of the two main sections of the brain; **Northern Hemisphere** or **Southern Hemisphere** = the two halves of the earth, north and south of the equator

hemlock *noun* North American softwood tree

hemp *noun* plant used to make rope; also producing an addictive drug

herb *noun* (a) plant which has no perennial stem above the ground during the winter period (b) plant which can be used as a medicine or to give a certain taste to food or to give a certain scent

◇ **herb-** *prefix* referring to plants or vegetation

◇ **herbaceous** *adjective* (plant) without perennial stems above the ground; **herbaceous border** = bed of herbaceous plants growing along the edge of a lawn

◇ **herbage** *noun* green foodstuffs eaten by grazing animals

◇ **herbal** *adjective* referring to herbs; **herbal remedies** = remedies made from plants, such as infusions made from dried leaves or flowers in hot water

◇ **herbalism** *noun* treatment of illnesses or disorders by the use of herbs or by medicines extracted from herbs

◇ **herbalist** *noun* person who treats illnesses or disorders by the use of herbs

◇ **herbarium** *noun* collection of plant specimens

◇ **herbicide** *noun* chemical which kills plants, especially weeds; **contact herbicide** = herbicide which kills plants by contact with the leaves, but may not kill a plant with large roots; **selective herbicide** = herbicide which only kills certain types of plant; **systemic**

herbicide = herbicide which is absorbed into the plant's sap system through its leaves

◇ **herbivore** or **herbivorous animal** *noun* animal which eats plants; *compare* CARNIVORE, OMNIVORE

herd 1 *noun* group of herbivorous animals which live together; *a herd of wildebeest or of elephants or of cows*; *compare* FLOCK 2 *verb* to tend a herd of animals; to crowd animals together; *livestock herding is the main source of revenue for the people of the area*

◇ **herdsman** *noun* farm worker who looks after a herd of animals

hereditary *adjective* which is transmitted from parents to offspring

◇ **heredity** *noun* occurrence of physical or mental characteristics in offspring which are inherited from their parents

hetero- *prefix* meaning different

◇ **heterogeneous** *adjective* having different characteristics or qualities

◇ **heterogenous** *adjective* coming from a different source

◇ **heterotrophic organism** or **heterotroph** *noun* organism (animal or parasite or fungus, etc.) which obtains its energy from carbon, by breaking down organic matter in the ecosystem and eating other organisms

QUOTE ice crystals form in the polar vortex of air that swirls over Antarctica in the southern winter. This allows a series of heterogeneous chemical reactions to occur on the surface of the crystals, creating large amounts of chlorine monoxide which destroys ozone

New Scientist

Hg *chemical symbol* for mercury

hibernate *verb* (in animals) to survive the cold winter months by a big reduction in metabolic rate and activity, and by using up stored body fat for food

◇ **hibernaculum** *noun* place (such as a nest) where an animal hibernates; *as the first frosts occur, small animals go into their winter hibernacula* NOTE: plural is **hibernacula**

◇ **hibernation** *noun* slowing of metabolism, reduction of activity and the using of body fat to survive the winter

QUOTE hibernating bats don't simply shut down for the winter. Their body temperatures and activity levels vary widely and from time to time they emerge from their hibernacula

BBC Wildlife

COMMENT: during the cold weather, many small mammals (such as hedgehogs) and reptiles hibernate. Their blood temperature falls, and their metabolism slows

hickory *noun* North American hardwood tree

hide *noun* shelter where birdwatchers can stay hidden while watching birds

high 1 *adjective* (a) tall or reaching far from the ground level; *altocumulus clouds form at higher levels than cumulus*; *high level inversion* = situation where warm air lies above cold air relatively high above the ground (b) (referring to numbers) of greater than average intensity, etc.; *the sample gave a high reading of radioactivity*; *the soil is red, and high in aluminium and iron oxide*; *an area of high pressure is moving south across the country*; *the regions with highest rainfall are those of the western mountains*; *UV rays are part of the high energy radiation from the sun*; *high alumina cement* = cement made of bauxite and limestone, which is used because it resists heat; *high energy foods* = foods containing a large number of calories, such as fats or carbohydrates, which give a lot of energy when they are broken down by the digestive system 2 *noun* area of high pressure; *subtropical high* = area of high pressure normally found near the subtropic

◇ **highlands** *noun* area of mountains; *vegetation in the highlands or highland vegetation is mainly grass, heather and herbs*

high-level radioactive waste *noun* waste which is hot and emits strong radiation

QUOTE consideration should be given to abandoning the site and declaring it unsuitable for the permanent disposal of high-level nuclear waste

Environmental Action

COMMENT: high-level waste is potentially dangerous and needs special disposal techniques. It is sealed in special containers, sometimes in glass, and is sometimes disposed by dumping at sea

high-risk *adjective* (person) who is very likely to catch a disease or develop a cancer or suffer an accident; *high-risk categories of worker*; *high-risk patient* = patient who has a high risk of catching an infection

high-yielding *adjective* which yields a high crop; *they have started to sow high-yielding varieties (HYV) of seed with very good results*

hill *noun* ground higher than the surrounding areas but not as high as a mountain

◇ **hillside** *noun* side of a hill

histamine *noun* substance released from mast cells throughout the human body which stimulates tissues in various ways; *the presence of substances to which 'someone is allergic*

releases large amounts of histamine into the blood; see also ANTIHISTAMINE

◇ **histaminic** *adjective* referring to histamine

histo- *prefix* referring to tissue

◇ **histochemistry** *noun* study of the chemical constituents of cells and tissues and also their function and distribution

◇ **histology** *noun* study of anatomy of tissue cells and minute cellular structures, done using a microscope after the cells have been stained

history *noun* study of what happened in the past; **case history** = details of what has happened to a patient under treatment

hoar (frost) *noun* frozen dew which forms on outside surfaces when the temperature falls below freezing point

hoe **1** *noun* garden implement, with a small sharp blade, used to break up the surface of soil or cut off weeds **2** *verb* to cultivate land with a hoe

holarctic region *noun* biogeographical region which includes the Nearctic region (i.e. North America) and the Palaearctic region (i.e. Europe, North Africa and North Asia)

holistic *adjective* (method of treatment) involving all the patient's mental and family circumstances rather than just dealing with the illness from which he is suffering

hollow **1** *adjective* (space) which is empty or with nothing inside; *water collects in the hollow stems of plants* **2** *noun* place which is lower than the rest of the surface; *frost occurs in low-lying areas, called frost hollows*

home range *noun* area occupied by an animal during the day-to-day course of activity (not to be confused with territory, which is a defended area, and may be part or all of the home range)

homeo- or **homoeo-** *prefix* meaning like or similar

◇ **homeostasis** *noun* (i) tendency of a system to resist change and maintain itself in a state of equilibrium; (ii) process by which the functions and chemistry of a cell or organism are kept stable, even when external conditions vary greatly

◇ **homeotherm** *noun* = HOMOIOOTHERM

homo- *prefix* meaning the same

◇ **homograft** *noun* graft of tissue from one organism to another of the same species

◇ **homosphere** *noun* zone of the earth's atmosphere, including the troposphere, the stratosphere and the mesosphere, where the

composition of the atmosphere remains relatively constant

homoiotherm *noun* organism which has warm blood and a steady body temperature; *compare POIKILOTHERM*

horizon *noun* (a) the boundary where the earth and sky appear to meet; *because of the curvature of the earth, the horizon looks curved when seen from a ship* (b) layer of soil which is of a different colour or texture from the rest

hormone *noun* substance produced in animals and plants in one part of the body which has a particular effect in another part of the body; **plant hormones** = hormones (such as auxin) which particularly affect plant growth; **juvenile hormone** = hormone in an insect larva which regulates its development into an adult; **hormone rooting powder** = substance which if placed on the shoot of a plant will encourage the formation of roots; **hormone weedkiller** = substance which is absorbed by a plant and prevents its growth

◇ **hormonal** *adjective* referring to hormones; **hormonal deficiency** = lack of necessary hormones

horticulture *noun* gardening, growing of plants for food or decoration

◇ **horticulturist** *noun* gardener, person who specializes in horticulture

host *noun* plant or animal on which a parasite lives; **intermediate host** = host on which a parasite lives for a time before passing on to another host; **definitive host** = host on which a parasite settles and breeds

hot *adjective* very warm; with a high temperature; *really hot weather only occurs in summer; the hottest part of the reactor is the core*; **hot rocks** = rock of high temperature near the earth's surface. They can be used to create geothermal energy by pumping down cold water and making use of the rising hot water which the rocks have heated; **hot spot** = place where background radiation is particularly high

QUOTE Scottish scientists have started on a map of radiation hot spots in Britain following the Chernobyl disaster

Farmers Weekly

QUOTE hot dry rock systems, where hot rocks alone at accessible depths are used to heat water pumped down from the surface

Environment

human **1** *adjective* referring to a member of *Homo sapiens*, that is a man, woman or child; **a human being** = a person; **the human race** = all human beings; **human ecology** = study of man and communities of people, the place which they occupy in the natural world, and

the ways in which they adapt to or change the environment 2 *noun* person; *most animals are afraid of humans*

humate *noun* salt which is derived from humus

humid *noun* (air) which is damp or which contains moisture vapour; *decomposition of organic matter is rapid in hot and humid conditions*

◇ **humidity** *noun* to make humid

◇ **humidifier** *noun* device for making dry air humid (as in air conditioning or central heating systems)

◇ **humidity** *noun* measurement of how much water vapour is contained in the air; **absolute humidity** = ratio of the mass of water vapour in a given quantity of air to the amount of air; **relative humidity** = amount of water vapour in a given quantity of air, shown as a proportion of the amount required to saturate the air; **humidity control** = method of making the air humidity remain at a certain level, often by adding moisture to the air circulating in central heating systems

humify *verb* to add water vapour to air to make it more humid

◇ **humification** *noun* breaking down of rotting organic waste to form humus

humus *noun* (a) fibrous organic matter in soil which makes the soil dark and binds it together (b) dark organic residue left after sewage has been treated in sewage works

hurricane *noun* tropical storm in the Caribbean or Eastern Pacific Ocean with extremely strong winds; **hurricane force wind** = wind blowing at force 12 on the Beaufort scale; *compare* CYCLONE, TYPHOON

husbanding *noun* using and keeping carefully; *a policy of husbanding scarce natural resources*

◇ **husbandry** *noun* farming or looking after animals and crops; *a new system of intensive cattle husbandry*

hybrid *adjective & noun* cross between two varieties or species of plant or animal; **hybrid vigour** = increase in size or rate of growth or fertility or resistance to disease found in offspring of a cross between two species

◇ **hybridization** *noun* production of hybrids

hydr- or **hydro-** *prefix* referring to water; **hydropower** or **hydroelectric power** = electricity produced by water used to drive turbines

hydrocarbon *noun* compound formed of hydrogen and carbon

COMMENT: hydrocarbons are found in fossil fuels such as coal, oil, petroleum and natural gas. Hydrocarbons form a large part of exhaust fumes from cars and contribute to the formation of smog. When released into the air from burning coal or oil they react in the sunlight with nitrogen dioxide to form ozone. Hydrocarbons are divided into aliphatic hydrocarbons (paraffins, acetylenes and olefins) and aromatic hydrocarbons (benzenes).

hydrochloric acid *noun* aqueous solution of hydrogen chloride, used widely in the chemical, food and oil industries. It also forms in the stomach as part of the digestive process. It is extremely corrosive

hydroelectricity *noun* electricity produced by water power

◇ **hydroelectric** *adjective* referring to hydroelectricity; *the valley was flooded to construct the hydroelectric scheme*; **hydroelectric energy** = electric power from turbines driven by water; **hydroelectric power station** = power station which produces electricity using a flow of water to turn the turbines

hydrogen *noun* chemical element, a gas which combines with oxygen to form water, with other elements to form acids, and is present in all animal tissue; it is also used as a moderator in some nuclear reactors **NOTE:** chemical symbol is H; atomic number is 1 **hydrogen sulphide** (H_2S) = colourless gas with an unpleasant smell, produced during industrial processes, which corrodes metal and is toxic to animals

◇ **hydrograph** *noun* graph showing the level of water or flow of water in a river or lake

◇ **hydrography** *noun* science of measuring and charting rivers, lakes and seas

◇ **hydrological** *adjective* referring to hydrology; **hydrologic** or **hydrological cycle** = cycle of events when water in the sea evaporates in the heat of the sun, forms clouds which deposit rain as they pass over land, the rain then drains away into rivers which return the water to the sea

◇ **hydrology** *noun* study of water, its composition and properties

◇ **hydrometer** *noun* instrument which measures the density of a liquid

◇ **hydromorphic soil** *noun* waterlogged soil found in bogs and marshes

◇ **hydrophyte** *noun* plant which lives in water or in marshy conditions

◇ **hydroponics** *noun* science of growing plants without soil but in sand or other granular material using a liquid solution of nutrients to feed them

◇ **hydrosere** *noun* succession of communities growing in water or in wet conditions

◇ **hydrosphere** *noun* all the earth's water in the sea, the atmosphere and on land

◇ **hydrostatic** *adjective* referring to water which is not moving; **hydrostatic pressure** = pressure of water at rest

hydrothermal *adjective* referring to water and heat under the earth's crust; **hydrothermal formations** = rock formations where water pockets or porous water-filled rock come into contact with magma, so creating steam; **hydrothermal vents** = places on the ocean floor where hot water and gas flow out of the earth's crust

QUOTE hydrothermal energy is used to produce electricity - more than 2,000 megawatts - at a geyser field north of San Francisco

Environment

hydroxide *noun* compound containing inorganic OH⁻ groups; these compounds are basic

hygiene *noun* (i) being clean and keeping healthy conditions; (ii) science of health; *nurses have to maintain strict personal hygiene*; **tropical hygiene** = hygiene relating to tropical regions

◇ **hygienic** *adjective* (i) clean; (ii) which produces healthy conditions; *don't touch the food with dirty hands - it isn't hygienic*

hygro- *prefix* meaning wet

◇ **hygrometer** *noun* scientific instrument for measuring humidity in the atmosphere

◇ **hygrometry** *noun* scientific measurement of atmospheric humidity

◇ **hygroscopic** *noun* substance which gives an indication of humidity (in some cases by changing colour)

◇ **hygroscopic** *adjective* (substance) which absorbs moisture from the atmosphere

hyp- *prefix* meaning less or too little or too small; *opposite* is **HYPER-**

◇ **hypalgesia** *noun* low sensitivity to pain

hyper- *prefix* meaning higher or too much or over or above; *opposite* is **HYP-** or **HYPO-**

◇ **hyperactive** *adjective* being very active

◇ **hyperparasite** *noun* parasite which is a parasite on other parasites

◇ **hypersensitive** *adjective* (person) who reacts more strongly than normal to an antigen

◇ **hypersensitivity** *noun* condition where an organism reacts unusually strongly to something (such as an allergic substance or food additive); *hypersensitivity to dairy products is quite common in children*

hypo- *prefix* meaning under or less or too little or too small; **hypodermic syringe** = instrument for injecting liquids under the skin; *opposite* is **HYPER-**

◇ **hypolimnion** *noun* lowest layer of water in a lake, which is cold and stationary and contains less oxygen than the epilimnion

◇ **hypothermia** *noun* reduction in body temperature below normal, for official purposes taken to be below 35°C

HYV = HIGH-YIELDING VARIETY

I *chemical symbol for iodine*

-iasis *suffix* meaning disease caused by something; **amoebiasis** = disease caused by an amoeba

ice *noun* (a) frozen water; Ice Age = long period of time when the earth's temperature was cool and large areas of the surface were covered with ice; **polar ice cap** = large area of thick ice covering the North or South polar regions; **ice floe** = sheet of ice floating in the sea; **ice sheet** = large area of thick ice covering the North or South poles (b) **dry ice** = solid carbon dioxide

◇ **iceberg** *noun* very large block of ice floating in the sea (formed when ice breaks away from an arctic glacier or ice sheet)

COMMENT: ice is formed when water freezes at 0°C. Ice is less dense than water, and so floats. Because the ice in the polar ice caps is very thick and has been formed over many thousands of years, scientists are able to discover information about the climate over a very long period of time by examining core samples obtained by drilling into the ice

-icide *suffix* meaning which kills; **pesticide** = substance which kills pests

identical *adjective* exactly the same; **identical twins** = monozygotic twins or two offspring born at the same time and from the same ovum, therefore exactly the same in appearance and sex

igneous *adjective* (rock such as basalt or granite) formed from molten lava; *compare* METAMORPHIC, SEDIMENTARY

COMMENT: igneous rocks are formed from lava which has either broken through the earth's crust (as in a volcanic eruption) or has entered the crust from below and formed a layer inside the crust

illegal *adjective* not done according to the law; *the illegal killing of a protected species; it is illegal to take eggs from the nests of rare birds*

◇ **illegally** *adverb* in an illegal way; *the company was accused of illegally felling protected forest*

illuviation *noun* deposition of particles and chemicals leached out from the topsoil into the subsoil

imbalance *noun* lack of balance or situation where one substance or species is dominant; *lack of vitamins A and E creates hormonal imbalances in farm animals*

immature *adjective* not mature; **immature cell** = cell which is still developing

immigration *noun* movement of an organism into a new area

immune *adjective* protected against an infection or allergic disease; *this strain is not immune to virus*

◇ **immunity** *noun* (a) (in animals) ability to resist attacks of a disease because antibodies are produced; *the vaccine gives immunity to tuberculosis*; **acquired immunity** = immunity which a body acquires and which is not congenital; **natural immunity** = immunity from disease inherited by newborn offspring from the mother (b) (in plants) resistance to disease through a protective covering on leaves or the formation of protoplasts or development of inactive forms of viruses

◇ **immunization** *noun* making a person immune to an infection, either by injecting an antiserum (passive immunization) or by giving the body the disease in such a small dose that the body does not develop the disease, but produces antibodies to counteract it

◇ **immunize** *verb* to give someone immunity from an infection NOTE: you immunize someone **against** a disease

impermeable *adjective* (substance) which does not allow a liquid or gas to pass through; (membrane) which allows a liquid to pass through, but not solid particles suspended in the liquid; *rocks which are impermeable to water*

impervious *adjective* (surface of a substance) which does not allow water to pass through it

impoverish *verb* to make poor; *overfarming has impoverished the soil*

◇ **impoverished** *adjective* made poor; if *impoverished soil is left fallow for some years, nutrients may build up in the soil again*

◇ **impoverishment** *noun* making poor; *overexploitation led to the impoverishment of the soil*

impregnate *verb* to fill something with a substance by passing it inside through the outer surface; *many fruits on sale are impregnated with pesticides even if they have been washed; wooden posts are impregnated with creosote*

imprint *verb* (of young animals) to learn from a source (usually the mother) by imitation at a very early age, usually occurring during a very brief period, such as the first few hours after a bird has hatched

impure *adjective* not pure

◇ **impurities** *plural noun* substances which are not pure or clean; *a filter which removes impurities from drinking water*

inactive *adjective* (a) (substance) which is not active (b) (volcano) which is not erupting or likely to erupt, though not necessarily extinct

◇ **inactivate** *verb* to make something inactive; *biopesticides are easily inactivated in sunlight*

inbreeding *noun* breeding between a closely related male and female, who have the same parents or grandparents, so increasing the possibility of congenital defects; *inbreeding depression* = reduction of characteristic strengths by inbreeding; *compare OUTBREEDING*

◇ **inbred** *adjective* suffering from inbreeding

incidence *noun* number of times something happens in a certain area or in a certain population over a period of time; *the incidence of radiation leaks has increased over the past four years; incidence rate* = number of new cases of a disease during a given period, per thousand of population

◇ **incident** *noun* something which happens; *last year six hundred incidents of oil pollution were reported; the Five-Mile Island incident* = the accident at the Five-Mile Island power station

incinerate *verb* to burn (waste)

◇ **incineration** *noun* burning (of waste); *uncontrolled incineration can contribute to atmospheric pollution; controlled incineration of waste is one of the most effective methods of disposal; ocean incineration* = burning of toxic waste in special ships at sea (at present only permitted in the North Sea)

◇ **incinerator** *noun* device which burns waste

QUOTE sludge incinerators have been shown to emit up to 1.8 µg per cubic metre of dioxins in the stack gases. A local incineration facility sited to reduce transport costs could therefore pose a toxicological hazard to residents

London Environmental Bulletin

incipient *adjective* which is just beginning or which is in its early stages; **incipient lethal level** = level of toxic substances at which 50% of the affected organisms will die

inclusive fitness *noun* the sum of an organism's Darwinian fitness with the fitness of its relatives

incompatible *adjective* which does not go together with something else; (tissue) which is genetically different from other tissue, making it impossible to transplant into that tissue; (graft) which does not take with a certain stock

◇ **incompatibility** *noun* being incompatible

indicator *noun* (i) substance which shows something, especially a substance secreted in body fluids which shows which blood group a person belongs to; (ii) substance which shows that another substance is present; *lichens act as indicators for atmospheric pollution; ecological indicator* = species which has particular requirements (acid soil, low temperatures, etc.) and whose presence in an area shows that these requirements are present also; **indicator species** = species which is very sensitive to changes in the environment, which can warn that environmental changes are taking place

indigenous *adjective* which is native to a place; *there are six indigenous species of monkey on the island; oaks are indigenous to the British Isles; the government encourages the planting of indigenous hardwoods where possible* NOTE: something is indigenous to a place

QUOTE the Gambia is believed to be the first country in Africa to have adopted regulations supporting the use of indigenous low-cost building materials

Appropriate Technology

individual *noun & adjective* single plant or animal of a species; *it is a native of North America, but individuals have been found as far south as Brazil*

induce *verb* to cause or bring about; **human-induced stress** = stress in animals caused by humans (as stress in birds which are being ringed)

◇ **inducer** *noun* (i) substance which changes the way in which an enzyme acts; (ii) substance which helps certain genes to be passed on from parent to offspring

◇ **induction** *noun* changing the way in which an enzyme acts

COMMENT: organochlorine type pesticides work by induction; they can affect the enzymes in animals in a food chain (birds for instance) which they are not intended to kill

industry *noun* all factories or companies or processes involved in the manufacturing of products

◇ **industrial** *adjective* referring to industries or factories; **industrial disease** = disease which is caused by the type of work done by a worker (such as by dust produced or chemicals used in the factory); **industrial effluent** = INDUSTRIAL WASTE; **industrial melanism** = phenomenon where certain animals (such as butterflies and moths) become darker in colour in industrial areas allowing them to match the trees and leaves which are covered with soot

◇ **industrialize** *verb* to equip with factories; **industrialized countries are trying to control soot emission**

◇ **industrialization** *noun* process of developing industry on a large scale in a country

◇ **industrial waste** or **industrial effluent** *noun* waste produced by an industrial process

COMMENT: industrial wastes can be divided into various types: solid waste, such as dust particles or slag from coal; liquid wastes from various processes, including radioactive coolants from power stations; and gas wastes, largely produced by the chemical industry

inert *adjective* without the power of action; **inert gases** = noble gases or gases (helium, neon, argon, krypton, xenon and radon) which do not react chemically with other substances

infect *verb* to contaminate with disease-producing microorganisms or toxins; to transmit infection

◇ **infection** *noun* entry of microbes into the body, which then multiply in the body; *as a carrier he was spreading infection to other people in the office*

◇ **infectious** *adjective* (disease) which is caused by microbes and can be transmitted to other persons by direct means; *this strain of flu is highly infectious*

◇ **infective** *adjective* (disease) caused by a microbe, which can be caught from another person but which cannot always be directly transmitted.

◇ **infectivity** *noun* being infective

infertile *adjective* not fertile or not able to reproduce or have offspring

◇ **infertility** *noun* not being fertile or not being able to reproduce

infest *verb* (of parasites) to be present in large numbers; *pine forests have been infested with beetles; infested plants should be dug up and burnt; the child's hair was infested with lice*

◇ **infestation** *noun* having large numbers of parasites; *the crop showed serious infestation with greenfly; the condition is caused by infestation of the hair with lice*

infiltration *noun* passing of waste water into the soil or into a drainage system; **infiltration capacity** = rate at which water is absorbed by soil

inflorescence *noun* a flower or group of small flowers, together with the stem

inflow *noun* action of flowing in; *an inflow of effluent into a river*

infrared rays or **infrared radiation** *noun* long invisible rays, below the visible red end of the colour spectrum, which form part of the warming radiation which the earth receives from the sun; **infrared photography** = taking photographs using an infrared camera, which shows up heat sources or which can be used to take pictures of wild animals at night

inhabit *verb* to live in a place

◇ **inhabitant** *noun* plant or animal which lives in a place

inhibit *verb* to make it difficult for something to happen; *lack of nutrients may inhibit plant growth*

◇ **inhibitor** *noun* growth inhibitor = substance which stops a plant growing

inlet *noun* passage or opening for sea water into the land

inorganic *adjective* (substance) which does not come from animal or vegetable sources and does not contain carbon; **inorganic substances include acids, alkalis and metals; inorganic pesticide or fungicide or herbicide** = pesticide or fungicide or herbicide made from inorganic substances such as sulphur

inquire *verb* to ask questions about something; *he inquired about the environmental effects of the proposed scheme*

◇ **inquiry** *noun* official investigation; *there has been a government inquiry into the radiation leaks*

insanitary *adjective* not sanitary or unhygienic; *cholera spread rapidly because of the insanitary conditions in the town*

insect *noun* small animal with six legs and a body in three parts; *insects were flying round the lamp; he was stung by an insect; insect bites*

= stings caused by insects which puncture the skin and in so doing introduce irritants

◇ **insecticide** *noun* substance which kills insects

◇ **insectivore** or **insectivorous animal** *noun* animal (such as a hedgehog) which eats insects; **insectivorous plant** = plant (such as the sundew) which attracts insects, traps them and then digests them

COMMENT: Insects form the class Insecta. The body of an insect is divided into three distinct parts: the head, the thorax and the abdomen. The six legs are attached to the thorax. There are two antennae on the head. Most insect bites are simply irritating, but some people can be extremely sensitive to the bites of certain types of insect (such as bee stings). Other insect bites can be more serious, as insects can carry the bacteria which produce typhus, sleeping sickness, malaria, filariasis, etc. Synthetic insecticides, though effective, are often persistent and kill other larger animals when they get into the food chain. Natural insecticides (i.e. those produced from plant extracts) are less harmful to the environment

insolation *noun* radiation from the sun

insoluble *adjective* which cannot be dissolved; *gold is insoluble in water*

inspect *verb* to examine or to look at something carefully; *the kitchens are inspected by health inspectors*

◇ **inspection** *noun* act of examining something; *the officials have carried out an inspection of the factory waste to see if it can be safely incinerated*; **inspection chamber** = large hole built above a drain, allowing someone to inspect the inside of the pipes to see if they are blocked; **US Inspection and Maintenance (I/M) program** = programme of testing cars to check if their emission levels are within government safety standards

◇ **inspector** *noun* person who inspects; **Government Health Inspector** = government official who examines offices or factories to see if they are clean and healthy

insulate *verb* to protect something against heat or cold; to prevent heat or cold escaping; *well-insulated houses need less heating*

◇ **insulation** *noun* preventing escape of heat; **insulation materials** = materials used to insulate houses

COMMENT: insulation can cut the cost of fuel needed for heating, by preventing heat escaping through windows, roofs, etc.

intake *noun* amount of a substance taken into an organism (either eaten or absorbed); *a study of food intake among grassland animals*;

the bird's daily intake of insects is more than half its own weight

intensity *noun* degree to which land is used; **low-intensity land** = land on which crops are not intensively cultivated

◇ **intensify** *verb* (a) to start doing something intensively (b) (of depression) to become deeper

◇ **intensification** *noun* (a) doing something in an intensive way; **intensification of farming** has contributed to soil erosion (b) becoming deeper (of a depression)

◇ **intensive** *adjective* **intensive cultivation** or **intensive farming** = (farming) in which as much use is made of the land as possible (growing crops close together or growing several crops in a year or using large amounts of fertilizer)

◇ **intensively** *adverb* in an intensive way
NOTE: the opposite is **extensive, extensification**

QUOTE the diet of animals kept in intensive units is usually quite different from what the animals would eat if foraging for themselves. Grazing animals have the ability to seek out certain plants which contribute to their health
Ecologist

inter- *prefix* meaning between

◇ **interbreed** *verb* to breed together (individuals from the same species can interbreed; those from different species cannot)

◇ **interdependent** *adjective* (two organisms or processes) which depend on each other

interfluvium *noun* land area between two rivers

interglacial (period) *noun* period between two Ice Ages when the climate becomes warmer

intermediate *adjective* between two extremes; **intermediate host** = host on which a parasite lives for a time before passing on to another; **intermediate waste** = waste from a nuclear reactor in the form of sludge, metal parts, etc., which are more radioactive than low-level waste and less dangerous than high-level waste; **intermediate technology** = technology which is between the advanced electronic technology of industrialized countries and the primitive technology in underdeveloped countries

internal combustion engine *noun* type of engine used in cars, where the fuel is a mixture of petrol and air burnt in a closed chamber (the cylinder) to give energy to the pistons, but at the same time giving off polluting gases

international *adjective* between countries; **the International Whaling Convention** = agreement (signed in 1946) to control the

commercial killing of whales; **International Union for the Conservation of Nature and Natural Resources (IUCN)** = international organization which coordinates the protection of species throughout the world, and publishes the red lists of endangered species

interoceptor *noun* nerve cell which reacts to a change taking place inside the body; *see also* CHEMORECEPTOR, EXTEROCEPTOR, RECEPTOR

interspecific *adjective* between species

intertidal zone *noun* area of sea water and shore between the high and low water marks

intra- *prefix* meaning inside

◇ **intraspecific** *adjective* among species

introduce *verb* to bring something into a new place; *several of the species of plant now common in Britain were introduced by the Romans; settlers introduced dogs to the island, with the result that all flightless birds became extinct; starlings were introduced to the USA in 1891*

◇ **introduction** *noun* (a) bringing something to a new place *before the introduction of grey squirrels, the red squirrel was widespread; the death rate from malaria was very high before the introduction of new anti-malarial techniques* (b) plant or animal which has been introduced to a new area; *it is not an indigenous species but a 19th century introduction*

intrusion *noun* area of rock which has pushed into other rocks; **igneous intrusion** = igneous rock which solidified before it reached the surface of the earth and remains as a layer among other rocks

invasion *noun* (i) arrival of large numbers of pests in an area; (ii) entry of bacteria into a body or first attack of a disease

inversion *noun* (i) turning something in the opposite direction; (ii) atmospheric phenomenon, where cold air is nearer the ground than warm air, making the temperature of the air rise as it gets further from the ground, trapping pollutants between the layers of air; **inversion layer** = upper limit of a layer of warm air trying to rise through a layer of cold air

QUOTE the government's decision to delay the start of morning classes was to protect schoolchildren from the hazards of atmospheric inversions, which are most common on winter mornings

Environment

COMMENT: air normally cools at a rate of 6.4°C per 1,000 metres of altitude. During the night, the ground cools as it loses heat by radiation and the air at ground level becomes cooler than the air above. This thermal inversion can cause smog, when the cooler ground-level air cannot move because there is no wind and remains trapped with its pollutants between the earth and the warm air above it

invertebrate *adjective & noun* (animal) that has no backbone

NOTE: the opposite is **vertebrate**

iodine *noun* chemical element which is essential to the body, especially to the functioning of the thyroid gland, found in seaweed; **tincture of iodine** = weak solution of iodine in alcohol, used as an antiseptic NOTE: chemical symbol is I; atomic number is 53

ion *noun* atom which has an electric charge (ions with a positive charge are called cations, and those with a negative charge are anions); **ion exchange** = exchanging of ions between a solid and a solution; **ion-exchange filter** or **water softener** = device attached to the water supply to remove nitrates or calcium from the water; *compare* NEUTRON

◇ **ionize** *verb* to give an atom an electric charge

◇ **ionization** *noun* productions of atoms with electric charges

◇ **ionizer** or **negative ion generator** *noun* machine that increases the amount of negative ions in the atmosphere of a room, so counteracting the effect of positive ions

◇ **ionosphere** *noun* layer of the atmosphere more than 90 kilometres above the surface of the earth, composed of nitrogen (70%), oxygen (15%) and helium (15%), in which atoms are ionized by solar radiation

COMMENT: it is believed that living organisms (including human beings) react to the presence of ionized particles in the atmosphere. Hot dry winds contain a higher proportion of positive ions than normal, and these winds (such as the foehn in Switzerland) cause headaches and other illnesses. If negative ionized air is introduced into an air-conditioning system, the incidence of headaches and nausea among people working in the building may be reduced

iroko *noun* African wood, formerly widely used, but now becoming rarer

iron *noun* metallic element essential to biological life and an essential part of human diet (found in liver, eggs, etc.); **iron ore** = rock which contains iron compounds, and from

which the metal can be extracted NOTE: chemical symbol is **Fe**; atomic number is 26

COMMENT: iron is an essential part of the red pigment in red blood cells. Lack of iron in haemoglobin results in iron-deficiency anaemia. The metal and alloys made from it are magnetic. Compass needles made from it point to magnetic north

irradiate *verb* (i) to subject something to radiation; (ii) to treat food with radiation to prevent it going bad

◇ **irradiation** *noun* (a) spread from a centre, as nerve impulses (b) use of rays to treat patients or to kill bacteria in food; *the irradiation of materials used in the construction of the power station caused severe damage*; total body irradiation = treating the whole body with radiation

COMMENT: food is irradiated with gamma rays from isotopes which kill bacteria. It is not certain, however, that irradiated food is safe for humans to eat, as the effects of irradiation on food are not known. In some countries irradiation is only permitted as a treatment of certain foods

irreversible *adjective* (process) which cannot be reversed

irrigate *verb* to supply land with water through a system of man-made channels

◇ **irrigation** *noun* supplying water to land to allow plants to grow; *new areas of land must be brought under irrigation to meet the rising demand for food*

QUOTE in 1950 about 2 million hectares of the Aral Sea zone were irrigated. These days, irrigation covers some 7 million hectares and provides the Soviet Union with 95% of its cotton

Guardian

COMMENT: irrigation can be carried out used powered sprinklers, or simply by channelling water along small irrigation canals from reservoirs or rivers. Irrigation is not necessarily an advantage, as it can cause salinization of the soil. This happens when the soil becomes waterlogged so that salts in the soil rise to the surface. At the surface, the irrigated water rapidly evaporates, leaving the salts behind in the form of a saline crust. Irrigation also has the further disadvantage of increasing the spread of disease. Water insects easily spread through irrigation canals and reservoirs

iso- *prefix* meaning equal

◇ **isobar** *noun* line on a map linking points of equal barometric pressure at the same time

◇ **isobaric chart** *noun* weather map showing the isobars at a given time

◇ **isohaline** *noun* line on a map linking areas of equal salt content

◇ **isohyet** *noun* line on a map linking points of equal rainfall

◇ **isoleucine** *noun* essential amino acid

◇ **isotach** *noun* line on a map linking points where the wind is blowing at the same speed

◇ **isotherm** *noun* line on a map linking points of equal temperature

isolate *verb* (a) to keep one patient apart from others (because he or she has a dangerous infectious disease) (b) to identify a single virus or bacteria among many; *scientists have been able to isolate the virus which causes legionnaires' disease; candida is easily isolated from the mouths of healthy adults*

◇ **isolated** *adjective* (area) which is a long way from any other place or from any human settlement; *specimen plants have been found in isolated points on cliffs above the North Sea*

◇ **isolation** *noun* separation of a patient, especially one with an infectious disease, from other patients; **isolation hospital** or **isolation ward** = special hospital or special ward in a hospital where patients suffering from infectious dangerous diseases can be isolated

isotope *noun* form of a chemical element which has the same chemical properties as other forms, but different atomic mass; **radioactive isotope** = natural or artificial isotope which sends out radiation, used in radiotherapy

COMMENT: uranium exists in several isotopes: uranium-238 is the commonest and is used in fast breeder reactors because of its property of releasing energy very slowly under normal conditions; Uranium-235 is the isotope used in fission, because of its ability to release energy rapidly

isthmus *noun* narrow piece of land linking two larger areas of land

itai-itai *noun* painful bone disease, caused by cadmium poisoning, found first in Japan, 'itai' is the Japanese expression for pain

IUCN = INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE AND NATURAL RESOURCES

Jj

J = JOULE

jet *noun* narrow spray of liquid or gas; **jet propulsion** = making something move forward by sending out a jet of water or air from a hole

◇ **jetstream** *noun* (a) wide stream of fast-moving air occurring at the top limit of the troposphere (at about 15 kilometres above the earth's surface) (b) stream of gases from a jet engine

jigger or **sandflea** *noun* tropical insect, whose larvae enter the skin between the toes, and travel under the skin, causing intense irritation

joule *noun* SI unit of energy NOTE: usually written J with figures: 25J

COMMENT: one joule is the amount of energy used to move one kilogram the distance of one metre, using the force of one newton. 4.184 joules equals one calorie

jungle *noun* (informal) tropical rainforest

juvenile *adjective & noun* young (animal or sometimes plant); **juvenile hormone** = hormone in an insect larva which regulates its development into an adult; **juvenile phase** = period of development of a plant before it flowers or of an animal before it becomes adult

Kk

K 1 = KELVIN **2** symbol for potassium **3**
Vitamin K = vitamin found in green vegetables like spinach and cabbage, which helps the clotting of blood and is needed to activate prothrombin

k abbreviation for KILO; **kg** = kilogram; **kJ** = kilojoule

kala-azar noun severe infection, occurring in tropical countries

COMMENT: kala-azar is a form of leishmaniasis, caused by the infection of the intestines and internal organs by a parasite *Leishmania* spread by flies. Symptoms are fever, anaemia, general wasting of the body and swelling of the spleen and liver

kaolin noun china clay, fine white clay used for making china and also for coating shiny paper; *spoil heaps from kaolin workings are bright white*

karst noun terrain typical of limestone country, with an uneven surface and holes and cracks due to weathering

karyotype noun the chromosome make-up of a cell, shown as a diagram or as a set of letters and numbers

katabatic wind adjective cold wind which flows downhill as the ground surface cools at night

NOTE: opposite is **anabatic**

katadromous = CATADROMOUS

kelvin noun base SI unit of measurement of thermodynamic temperature

NOTE: temperatures are shown in kelvin without a degree sign: **20K**. On the kelvin scale 0°C is equal to 273.15K

kerosene noun fuel distilled from petroleum

kg = KILOGRAM

khamisin noun hot wind which brings dust storms in North Africa

kieselguhr noun diatomaceous type of earth formed from the skeletons of diatoms

kill 1 noun (a) act of killing; *pollutants in water are one of the main causes of fish kills* (b) prey which has been killed; *the vultures surrounded the remains of the lion's kill* **2** verb to make someone or something die; *she was given the kidney of a person killed in a car crash; heart attacks kill more people every year; antibodies are formed to kill bacteria*

◇ **kill off** verb to kill all the individual members of a species (usually one by one); *dodos were killed off by eighteenth century sailors*

kiln noun furnace used for making pottery or bricks, etc.; *the smoke from the brick kilns was taken away by the prevailing winds*

kilo- prefix meaning one thousand

◇ **kilocalorie** noun SI unit of measurement of heat (= 1,000 calories) NOTE: when used with numbers **kilocalories** is usually written **Cal**. Note that it is now more usual to use the term **joule**

◇ **kilogram** or **kilo** noun base SI unit of measurement of weight (= 1,000 grams); *two kilos of sugar; he weighs 62 kilos (62 kg)* NOTE: when used with numbers **kilos** is usually written **kg**

◇ **kilogray** noun SI unit of measurement of absorbed radiation (= 1,000 grays)

◇ **kilojoule** noun SI measurement of energy or heat (= 1,000 joules) NOTE: with figures usually written **kJ**

◇ **kilowatt** noun unit of measurement of electricity (= 1,000 watts); **kilowatt-hour (kWh)** = one thousand watts of electricity used for one hour; *the electricity consumption is 250 kWh*

kingdom noun largest category in the classification of organisms; *the largest species in the animal kingdom is the whale*

COMMENT: the different kingdoms are: Kingdom Monera, Kingdom Protista, Kingdom Plantae, Kingdom Fungi and Kingdom Animalia. See the chart in the Supplement

kJ = KILOJOULE

knock *verb* (of petrol engine) to make a loud noise as the mixture of petrol and air explodes, caused when the mixture is not rich enough in petrol; **antiknock additive** or **antiknocking additive** = substance (such as tetraethyl lead) which is added to petrol to prevent knocking

COMMENT: antiknock additives increase the power of petrol but create dangerous lead pollution through exhaust fumes

knot *noun* unit of measurement of speed

COMMENT: one knot is equal to 1.85km/h. Knots are used for measuring the speed of water currents, wind, and ships

Kr *chemical symbol* for krypton

Krebs cycle or **citric acid cycle** *noun* important series of reactions in which the

intermediate products of fats, carbohydrates and amino acid metabolism, are converted to carbon dioxide and water in the mitochondria

krill *noun* masses of tiny shrimps which live in cold seas and form the basic diet of many marine animals including whales

krypton *noun* inert gas found in very small quantities in the atmosphere

NOTE: chemical symbol is **Kr**; atomic number is 36

kW = KILOWATT

kwashiorkor *noun* malnutrition of small children, mostly in tropical countries, causing anaemia, wasting of the body and swollen liver

kWh = KILOWATT-HOUR

L

lab *noun informal* = LABORATORY *we'll send the specimens away for a lab test; the lab report is negative; the samples have been returned by the lab*

laboratory *noun* special room where scientists can do research or can test chemical substances or can grow tissues in cultures, etc.; *the samples of water from the reservoir have been sent to the laboratory for testing; laboratory officer* = qualified person in charge of a laboratory; *laboratory techniques* = methods or skills needed to perform experiments in a laboratory; *laboratory technician* = person who does practical work in a laboratory and has particular care of equipment

lacustrine *adjective* referring to a lake or pond

lag *verb* to cover (water pipes) with an insulating substance to protect them against cold or to stop heat escaping; *boilers and pipes should be carefully lagged to prevent heat loss*
 ◇ **lagging** *noun* material used to lag pipes

lagoon *noun* (a) shallow part of the sea in the tropics, surrounded or almost surrounded by reefs (b) artificial lake used for purifying sewage; *matturation lagoon* = pond used in the final stages of sewage treatment; *stabilization lagoon* = pond used to purify sewage in warm countries by allowing sunlight to fall on the mixture of sewage and water

lake *noun* (a) large area of fresh water surrounded by land; *salt lake* = low-lying lake with water which has a very high salt content because of evaporation and insufficient inflow of fresh water; *see also* DYSTROPHIC, EUTROPHIC, MESOTROPHIC, OLIGOTROPHIC (b) large quantity of liquid produce stored because of overproduction; *a wine lake or a milk lake; see also* MOUNTAIN

land *noun* solid part of the earth's surface (as opposed to the sea); *land breeze* = light wind which blows from the land to the sea, for example during the day when the land is warm; *land reclamation* = bringing back into productive use a piece of land which was not usable before (e.g. a waste site); *land use* = way in which the land is used; *they are carrying out a study of land use in northern areas*

landfill *noun* way of disposing of domestic rubbish by putting it into holes in the ground and covering it with earth; *the council has decided to use the old gravel pits as a landfill site; landfill sites can leak pollutants into the ground water; more than 2,000 landfills have been closed due to tighter environmental laws; landfill sites, if properly constructed, can be used to provide gas for fuel*

NOTE: in US English this is called **sanitary landfill**

◇ **landfilling** *noun* disposing of solid waste by putting it into holes in the ground and covering it with earth

landlocked *adjective* entirely surrounded by land

◇ **landmass** *noun* large area of land (as opposed to the ocean); *the continental landmass of the United States*

◇ **landrace** *noun* native species of plant or animal which has not been cultivated

◇ **landscape** *noun* scenery, general shape, structure and contents of the surface of an area of land; *urban landscape* = landscape of a town

◇ **landslide** or **landslip** *noun* sudden fall of large amounts of soil and rocks down the side of a mountain

lapse *noun* short period of time which separates two happenings

◇ **lapse rate** *noun* rate at which temperature changes according to altitude; *adiabatic lapse rate* = rate of temperature change in rising air (10°C per thousand metres for dry air and 5.8°C per 1,000 m for damp air); *normal environmental lapse rate* or *temperature lapse rate* = rate at which the temperature of the air falls as one rises above the earth (about 6.4°C per thousand metres, under conditions where there are no upward air currents or wind)

larch *noun* European softwood tree

larva *noun* stage (caterpillar or grub) in the development of an insect or animal, after the egg has hatched but before the animal becomes adult NOTE: plural is **larvae**

◇ **larval** *adjective* referring to larvae; *larval stage* = early stage in the development of an insect after it has hatched from an egg

lateral *adjective* at the side; **lateral moraine** = deposit of sand and gravel left at the sides of a glacier

laterite *noun* hard rock-like clay found in the tropics, formed when latosol dries out; *in some countries houses are built of laterite*

◇ **lateritic** *adjective* (soil) which contains laterite

◇ **laterization** *noun* process of weathering soil into hard laterite

◇ **laterize** *verb* to create laterite by exposing tropical soil to weather

◇ **latosol** *noun* type of reddish soft soil, found in tropical areas, and characterized by deep weathering and hydrous oxide material

COMMENT: when tropical rainforests are cleared, the soil beneath rapidly turns to laterite as nutrients are leached out by rain. Laterized land is incapable of cultivation and such areas turn to desert

latex *noun* (i) white fluid from a plant such as the poppy; (ii) white fluid from the rubber tree, which is treated and processed to make rubber

latitude *noun* position on the earth's surface measured in degrees north or south of the equator; **high latitudes** = areas near the North Pole; **mid-latitudes** = areas halfway between the poles and the equator

COMMENT: together with longitude, this is used to indicate an exact position on the earth's surface. Latitude is measured in degrees, minutes and seconds. The centre of London is latitude 51° 30'N, longitude 0° 5'W

lava *noun* molten rock and minerals which flow from an erupting volcano and solidify into various types of igneous rock; *lava flows from the volcano destroyed sugar plantations*

lawrencium *noun* one of the transuranic elements NOTE: chemical symbol is **Lr**; atomic number is 103

layer 1 *noun* (a) flat area of a substance under or over another area NOTE: in geological formations, layers of rock are called **strata**; layers of soil are called **horizons** (b) stem of a plant which has made roots where it touches the ground 2 *verb* to propagate a plant by bending a stem down until it touches the soil and letting it form roots there

leach *verb* to wash something out of soil by passing water through it; *excess chemical fertilizers on the surface of the soil leach into rivers and cause pollution; nitrates have leached into ground water and contaminated the water supply*

◇ **leachate** *noun* (i) substance which is washed out of the soil; (ii) liquid which forms at the bottom of a landfill site

◇ **leaching** *noun* process by which substances are washed out of the soil; **leaching field** = area round a septic tank with pipes which allow the sewage to drain away underground

lead *noun* very heavy soft metallic element, which is poisonous in compounds and is used as a shield in nuclear reactors NOTE: chemical symbol is **Pb**; atomic number is 82

◇ **leaded petrol** *noun* petrol to which lead tetraethyl has been added to improve its performance

◇ **lead-free** *adjective* with no lead in it; **lead-free petrol or unleaded petrol** = petrol with no lead in it

◇ **lead poisoning** *noun* poisoning caused by taking in lead salts

COMMENT: small children are particularly vulnerable to lead pollution, as lead affects brain development. Lead can enter the diet through drinking water which has been kept in lead pipes; it can also enter the body through paint (children's toys must be painted with lead-free paint). Lead is added to petrol to prevent knocking and give more power, but it causes lead fumes which are toxic and can be avoided by using lead-free petrol. Lead poisoning also occurs in birds, such as swans, which have eaten the lead pellets used by fishermen to weight their lines

leader stroke *noun* first lightning flash, which makes a path for other flashes to follow

leaf *noun* green, usually flat, part of a plant, growing from a stem, whose purpose is to activate photosynthesis, the means by which the plant gets energy from sunlight

leak 1 *noun* escape of liquid or gas from a sealed container; *the government is worried about the leaks of radioactive gas into the atmosphere* 2 *verb* (of gas or liquid) to escape from a container into the environment; *gallons of lethal acid leaked into the river from the chemical plant*

◇ **leakage** *noun* act of leaking; *the monitoring team reported the leakage of oil from the tanker*

QUOTE children were warned to stay away from three watercourses yesterday after several hundred gallons of sulphuric acid leaked into a stream

Guardian

lean-burn engine *noun* type of car engine adapted to use less fuel than normal engines, and so release less carbon monoxide and nitrogen oxide into the atmosphere

lee *adjective & noun* (side) which is protected from the wind; *the trees on the lee side of the house grow better than those on the windward side*

◇ **leeward** *adjective* protected from the wind or away from the wind

legume *noun* plant which produces seeds in pods (such as pea and bean plants); *grass and legume associations are common in European pastureland*

◇ **Leguminosae** *noun* family of plants (including pea and bean plants) which produce seeds in pods

◇ **leguminous** *adjective* (plant) which produces seeds in pods

lentic *adjective* referring to stagnant water

Lepidoptera *noun* order of insects which includes butterflies and moths

-**less** *suffix* meaning without; a fishless lake = a lake with no fish

lessen *verb* to make less strong; *the company is taking steps to lessen the release of pollutants into the atmosphere*

lethal *adjective* which can kill; *these fumes are lethal if inhaled*; **lethal dose 50% (LD50)** or **mean lethal dose** = dose of a drug which will kill half the animals on which it is tested; **lethal gene** = gene which can kill the person who inherits it; **lethal yellowing (LY)** = disease which attacks and kills coconut palms

leucine *noun* essential amino acid

levee *noun* (in the USA) dyke, embankment built up along the bank of a river to prevent flooding

level 1 *adjective* flat or horizontal; *the mountains give way to miles of level grassy plain* **2** *noun* amount; *smoke levels in the city are only 10% of what they were twenty years ago*; *forest will gradually die if pollution levels remain constant*; *present levels of water pollution are not acceptable*; *the fish contained higher than permitted levels of mercury* **3** *verb* to make something become flat

QUOTE atmospheric levels of carbon dioxide are increasing at about 0.35 per cent a year
New Scientist

ley *noun* field in which crops are grown in rotation with periods when the field is under pasture

COMMENT: ley farming is an essential part of organic farming: pasture land is fertilized by the animals which graze on it, and then is ploughed for crop growing. When the land has been exhausted by the crops, it is put back to pasture to recover

liana *noun* climbing plant found in tropical rainforest

lias *noun* type of rock formation consisting of shale and limestone

lichen *noun* primitive plant which grows on the surface of stones or trunks of trees and can survive in arctic climates

COMMENT: lichens are formed of two organisms: a fungus which provides the outer shell and algae which provide chlorophyll and give the plant its colour. Lichens are very sensitive to pollution, especially sulphur dioxide, and act as indicators for atmospheric pollution. They also provide food for many arctic animals

life *noun* (a) state of active metabolism or of being alive; **life cycle** = all the stages through which an organism passes from fertilization to death; **life expectancy** = number of years a person of a certain age is likely to live; **life forms** = different types of organisms; **life sciences** = sciences (such as biology or botany) which study living organisms; **life system** = part of an ecosystem which is formed of a living organism and the parts of the environment which support it; **life table** = chart showing how long a person or animal or plant is likely to live; **life-threatening disease** = disease which may kill a person (b) plants, animals and all kinds of living organisms; *deforestation has destroyed animal life in the area* see also WILDLIFE

light 1 *adjective* (a) not heavy; **light water** = ordinary water (as opposed to heavy water or deuterium oxide); **light water reactor (LWR)** = nuclear reactor which uses ordinary water as a coolant (b) bright so that one can see well; *at six o'clock in the morning it was just getting light* **2** *noun* radiation in the part of the electromagnetic spectrum which eyes are adapted to receive; *the light of the sun makes plants green*; *there's not enough light in here to take a photo*; **light adaptation** = changes in the eye to adapt to an abnormally bright or dim light or to adapt to normal light after being in darkness; **light reflex** = reflex of the pupil of the eye which contracts when exposed to bright light; **light waves** = waves travelling in all directions from a source of light which stimulate the retina and are visible

lightning *noun* discharge of electricity between clouds and the earth, which gives a bright flash and makes the sound of thunder;

sheet lightning = lightning where the flash cannot be seen, but where the clouds are lit by it; **lightning arrester** = device which prevents surges of electric current in a system, caused by lightning striking a building, which can damage equipment; **lightning conductor** or **lightning rod** = length of metal running down the outside wall of a building to the ground, which acts as a channel for the electric current when lightning strikes the building

lignite *noun* brown coal, type of soft coal with a low carbon content

lime *noun* (a) calcium compound (calcium oxide) made from burnt limestone and used to spread on soil to increase the pH level (b) common European hardwood tree

◇ **limestone** *noun* common sedimentary rock

COMMENT: limestone is formed of calcium minerals and often contains fossilized shells of sea creatures. It is used for building. Limestone is porous in its natural state and may form large caves by being weathered by water

limit 1 *noun* furthest point or place beyond which you cannot go; *they have set strict limits on the amount of fish which foreign fishing boats are allowed to catch* 2 *verb* to set a limit to something; *the government has limited the number of barrels of oil to be extracted each day*; **limiting factor** = factor which limits the growth of an organism

limn- *prefix* referring to fresh water

◇ **limnetic** *adjective* referring to deep fresh water; **limnetic zone** = area of deep water away from the edge of a lake, in which plants cannot live, but where phytoplankton can exist

◇ **limnic** *adjective* (deposits) in fresh water

◇ **limnology** *noun* study of fresh water (such as rivers and lakes)

lindane *noun* organochlorine pesticide, which is harmful to some animals such as bees and fish

line 1 *noun* row of things, one after another; **line squall** = belt of thunderstorms, which advance in a line 2 *verb* to cover the inside of a container to prevent the contents escaping; *landfill sites are lined with nylon to prevent leaks of dangerous liquids*

◇ **liner** *noun* material (such as nylon sheets) used to line something

link *noun* something which joins two things; **critical link** = organism in a food chain that is responsible for taking up and storing nutrients, which are then passed on down the chain

Linnaean system *adjective* scientific system of naming organisms worked out by the Swedish scientist Carolus Linnaeus (1707-1778)

COMMENT: the Linnaean system (or binomial classification) gives each organism a name made up of two main parts. The first is a generic name referring to the genus to which the organism belongs, and the second is a specific name which refers to the particular species. Organisms are usually identified by using both their generic and specific names, e.g. *Homo sapiens* (man) and *Felis catus* (domestic cat). The generic name is written or printed with a capital letter. Both names are usually given in italics, or are underlined if written or typed

linoleic acid *noun* one of the essential fatty acids which cannot be synthesized and has to be taken into the body from food (such as vegetable oil)

linolenic acid *noun* one of the essential fatty acids

lipid *noun* fat or fatlike substance which exists in human tissue and forms an important part of the diet; **lipid metabolism** = chemical changes where lipids are broken down into fatty acids

COMMENT: lipids are not water-soluble. They float in the blood and can attach themselves to the walls of arteries causing atherosclerosis

liquid *adjective & noun* matter (like water) which is not solid and is not a gas, and has no shape

◇ **liquefaction** *noun* making a solid or gas into liquid

◇ **liquefy** *verb* to make a gas into liquid; **liquefied petroleum gas (LPG)** = gas (either propane or butane, or a combination of both) produced by refining crude petroleum oil and used for domestic heating, camp stoves, etc.; **liquefied natural gas (LNG)** = natural gas, extracted from the earth, cooled and transported in containers

lith- *prefix* meaning stone

◇ **lithosere** *noun* succession of communities growing on rock

◇ **lithosol** *noun* soil which forms on the surface of rock, with no soil horizons

◇ **lithosphere** *noun* (i) the earth's solid surface, together with the molten interior; (ii) solid surface of the earth which lies above the asthenosphere

◇ **lithospheric** *adjective* referring to the lithosphere; **lithospheric plates** = solid masses of the earth's surface, of the size of continents, which move slowly on the low velocity zone

litmus *noun* organic matter used to indicate acidity (it becomes red when the pH factor falls below pH7 indicating acid, and becomes blue when pH is above pH7 indicating alkaline)

litre or **US liter** *noun* measurement of liquids (equal to 1.76 pints)

NOTE: written l with figures; 2.5 l

litter 1 *noun* (a) (i) dead leaves lying on the floor of a forest; (ii) rubbish left by people (b) group of young mammals born to one mother at the same time 2 *verb* (a) to lie all over the place; *the valley is littered with huge boulders* (b) to have a litter of young; *the bear litters in early spring*

littoral 1 *adjective* referring to the coast; **littoral currents** = currents which move along the shore; **littoral drift** = movement of sand as it is carried by the sea along the coastline; **littoral zone** = (i) area of fresh water at the edge of a lake where plants can exist; (ii) area of the sea and shore between the high and low water marks 2 *noun* part of the land at the edge of the sea

live 1 *adjective* (a) active or carrying out metabolism (b) carrying electricity; *he was killed when he touched a live wire* 2 *verb* to be alive; *animals which live partly in water and partly on land are amphibians*

◇ **live off** *verb* to exist by eating; *these fish live off the debris which sinks to the bottom of the lake*

◇ **live on** *verb* (a) to eat or drink matter; *most apes live on berries and roots* (b) to exist on the surface of something; *lice live on the skin of their host*

◇ **livestock** *noun* cattle and other farm animals which are reared to produce meat or milk or other products; *livestock production has increased by 5%; pastoralists move their livestock from place to place to find new grazing*

LNG = LIQUEFIED NATURAL GAS

load *noun* (a) cargo carried by a ship or plane or lorry; **load on top** = way of carrying crude oil, where water used to clean out tanks is left in a ballast tank and crude oil is carried on top of it (b) amount of something which is carried; **critical load** = highest level of pollution which will not cause permanent harm to the environment

loam *noun* good dark soil, with medium-sized grains of sand, which crumbles easily and is very fertile

◇ **loamy** *adjective* crumbly fertile dark (soil)

lobby 1 *noun* group of people or a pressure group which tries to influence MPs or tries to influence the passage of laws; *the car lobby* =

people who try to persuade MPs that cars should be encouraged and not restricted; **the environmentalist lobby** = group of people who try to persuade MPs that the environment must be protected, that pollution must be stopped, etc. 2 *verb* to ask someone (such as an MP or local official) to do something on your behalf; *they went to lobby their MP about the plan to build houses on the Green Belt*

◇ **lobbyist** *noun* person who is paid by a pressure group to act on the group's behalf

loch *noun* (in Scotland) lake; **Loch Ness monster** = large prehistoric aquatic animal believed by some people to live in Loch Ness, in Scotland

locust *noun* flying insect which occurs in subtropical areas, flies in swarms and eats large amounts of vegetation

lode *noun* deposit of metallic ore

loess *noun* fine fertile soil formed of tiny clay and silt particles deposited by the wind

log *noun* large piece of wood cut from the trunk of a tree

◇ **logger** *noun* person who fells trees for use

◇ **logging** *noun* cutting down trees for use

QUOTE logging is central to deforestation in the tropics. Loggers open up the forest for local people to exploit

Environment Now

longitude *noun* point on the earth's surface measured in degrees east or west

COMMENT: longitude is measured from Greenwich (a town just east of London), and together with latitude gives the exact position of a place on the earth's surface. It is measured in degrees, minutes and seconds: the centre of London is latitude 51 30N, longitude 0 5W

long-range *adjective* (forecast) for a long period of time

◇ **longshore** *adjective* (current) which flows along the shore; **longshore drift** = movement of sand particles along the shore, caused by longshore currents

◇ **long-term** *adjective* which lasts for a long time; *the long-term effects of exposure to radiation from power lines are not yet known*

looping *noun* situation where a plume of smoke from a tall chimney is brought down to ground level by air currents and then rises again

loss *noun* not having something any more; **heat loss** = amount of heat lost through bad insulation

lough *noun* (in Ireland) lake

low 1 *adjective & adverb* near the bottom or towards the bottom; not high; *the temperature is too low here for oranges to grow*; **low blood pressure** or **hypotension** condition where the pressure of the blood is abnormally low; **low-calorie diet** = diet with few calories (to help a person to lose weight); **low-fat diet** = diet with little animal fat (for example, to help skin conditions); **area of low pressure** = cyclone, area in which the atmospheric pressure is low and the air turns in the same direction as the earth; **low velocity zone** = area of the interior of the earth (below the crust) where earthquake shock waves travel particularly slowly; **low-level waste** = waste which is only slightly radioactive and does not cause problems for disposal; **low-waste technology** = technology which produces little waste 2 *noun* depression, area of low atmospheric pressure; *a series of lows are crossing the Atlantic towards Iceland*

◇ **lower** *verb* to make something go down; to reduce; *they covered the patient with wet cloth to try to lower his body temperature*

◇ **low-grade** *adjective* poor or not of very high quality; **low-grade ore** = ore which contains only a small percentage of metal; **low-grade petrol** = petrol with a low octane rating

◇ **lowlands** *noun* area of low land (as opposed to hills and mountains, or highlands); *vegetation in the lowlands or in the lowland areas is sparse*

LPG = LIQUEFIED PETROLEUM GAS

Lr *chemical symbol* for lawrencium

lucerne *noun* plant of the Leguminosae family, grown to use as fodder

lumber *noun* (in the USA and Canada) timber, trees which have been cut down

◇ **lumberjack** *noun* (in the USA and Canada) logger, person who cuts down trees

lunar *adjective* referring to the moon; **lunar eclipse** = situation when the shadow of the earth falls across the moon cutting off the light visible from earth; **lunar phases** = changes in the appearance of the moon as it moves from new to full and back again every 29 days (the phases are: new moon, first quarter, full moon and last quarter)

lush *adjective* thick rich (vegetation); *the cattle were put to graze on the lush grass by the river*; *the lush tropical vegetation rapidly covered the clearing*

LWR = LIGHT WATER REACTOR

LY = LETHAL YELLOWING

lysine *noun* essential amino acid

Mm

MAC = MAXIMUM ALLOWABLE CONCENTRATION

macro- prefix meaning large NOTE: opposite is **micro-**

macrobiotics *noun* system of eating which promotes the use of food without additives or preservatives, especially whole grains, fruit and vegetables; **macrobiotic food** = food which has been produced naturally without artificial additives or preservatives

COMMENT: macrobiotic diets are usually vegetarian and are prepared in a special way; they consist of beans, coarse flour, fruit and vegetables

◇ **macroclimate** *noun* climate covering a large area

◇ **macronutrient** *noun* nutrient which an organism uses in very large quantities, such as oxygen, carbon, hydrogen, etc.

◇ **macrophyte** *noun* large water plant (as opposed to phytoplankton)

magma *noun* molten substance in the earth's mantle, which escapes as lava during volcanic eruptions and solidifies to form igneous rocks

◇ **magmatic** *adjective* referring to magmas

COMMENT: magma is formed of silicate materials which include crystals and dissolved gases

magnesium *noun* chemical element, a white metal which is used in making alloys, and is also an essential element in biological life (in human diets, it is found in green vegetables) NOTE: chemical symbol is **Mg**; atomic number is 12

magnet *noun* piece of iron or alloy containing iron, with the property of attracting other pieces of iron; **electromagnet** = magnet made of a coil of wire through which electricity is passed

◇ **magnetic** *adjective* having the attraction of a magnet; **magnetic anomaly** = way in which the local magnetic field differs from the normal magnetic field in a certain area; **magnetic declination** = angle of difference between the direction of the North Pole and that of the North Magnetic Pole; **magnetic**

field = area round a body which is under the influence of the body's magnetic attraction; **magnetic pole** = one of two poles (near the North and South Poles) which are the centres of the earth's magnetic field and two which a compass points; **magnetic storm** = sudden disturbance of the earth's magnetic field which affects compasses and radio and TV waves

◇ **magnetohydrodynamics (MHD)** *noun* scientific study of charged gases and liquids in a magnetic field which may be used to generate electricity

magnification *noun* measure of increase, especially in the apparent size of an image seen through a microscope; **biological magnification** = way in which a pollutant increases in concentration at each level of a food chain

mahogany *noun* dark tropical hardwood, now becoming rare

main 1 *adjective* most important; **main drain** or **main sewer** = large sewer which collects sewage from an area; **main drainage** = system of collection of sewage from houses by pipes which take the sewage to treatment plants (as opposed to each house being provided with a septic tank) **2** *noun* large pipe; **water main** = large pipe which brings mains water to a house

◇ **mains** *noun* system of pipes which bring water to houses

maintain *verb* to keep up

◇ **maintenance** *noun* (i) keeping at a certain level; (ii) keeping the population of a species at a certain level; **maintenance ration** = quantity of food needed to keep a farm animal healthy, but not productive

maize *noun* widely grown cereal crop

NOTE: in US English called **corn**

make up water *noun* water introduced into an irrigation or sewage system to make up for water lost by leaking

malaria or **paludism** *noun* tropical disease caused by a parasite *Plasmodium* which enters the body after a bite from a mosquito

COMMENT: malaria is a recurrent disease which produces regular periods of shivering, vomiting, sweating and headaches as the parasites develop in the body; the patient also develops anaemia

◇ **malarial** *adjective* referring to malaria; **malarial parasite** = parasite transmitted to human bloodstream by the bite of a mosquito

◇ **malarious** *adjective* (region) where malaria is endemic

malathion *noun* organophosphorous insecticide used to kill small aphids and mites

male *noun & adjective* (animal) which produces sperm; (plant) that produces pollen

malnutrition *noun* (i) bad nutrition, as a result of starvation or wrong diet or bad absorption of food; (ii) not having enough to eat

mammal *noun* animal of the class Mammalia (such as the human being) which gives birth to live young, secretes milk to feed them, keeps a constant body temperature and is covered with hair

manage *verb* (a) to control; to be in charge of; the department is in charge of managing land resources; **managed woodland** = woodland which is controlled by felling, coppicing, planting, etc. (b) to be able to do something; to succeed in doing something; **protesters managed to prevent the new road being built**

◇ **management** *noun* organized use of resources or materials; **woodland management** = controlling an area of woodland so that it is productive (by regular felling, coppicing, planting, etc.)

◇ **manager** *noun* person who manages an organization, etc.

manganese *noun* metallic trace element which is used in making steel and is essential for biological life

NOTE: chemical symbol is **Mn**; atomic number is 25

mangrove *noun* genus of tropical shrub or tree which grows in salt-water swamps in the estuaries of rivers in Asia and America; **mangrove forests cover muddy tidal marshes, lagoons and estuaries**; **mangrove swamp** = swamp covered with mangroves

COMMENT: some mangrove trees produce adventitious roots which take root near the parent tree and form new trees; others produce seeds which have roots even before they fall from the tree. The result is that mangrove swamps are very thick and spread quickly

manhole *noun* hole in a roadway or pavement leading to a shaft down which workmen can go to inspect the sewers

mantle *noun* layer of the interior of the earth, between the solid crust and the core, formed of magma

manufacture *verb* (i) to make a product for sale, using machines; (ii) to produce a chemical naturally; **ozone is constantly being manufactured and constantly being destroyed by natural processes in the atmosphere**

◇ **manufacturer** *noun* person or company which produces machine-made products; **the company is a large manufacturer of farm machinery**

◇ **manufacturing** *noun* producing machine-made products for sale; **manufacturing industries** = industries which take raw materials and make them into finished products

manure 1 *noun* animal dung used as fertilizer; **artificial manure** = artificial fertilizer, manufactured chemical substance used to increase the nutrient level of the soil; **green manure** = rapid-growing green vegetation (such as mustard plants) which is grown and ploughed into the soil to rot and act as manure 2 *verb* to spread animal dung on land as fertilizer

maple *noun* hardwood tree of northern temperate regions, some varieties of which produce sweet sap which is used for making sugar and syrup

marble *noun* form of limestone which has been metamorphosed, used especially in building as it can be polished to give a flat shiny surface

margarine *noun* substance made from vegetable fat which looks like butter and is used instead of butter

marginal *adjective* (land) at the edge of cultivated land (such as edges of fields, banks beside roads, etc.); (plant) which grows at the edge of two types of habitat; **cultivating marginal areas can lead to erosion**

mariculture *noun* type of fish-farming where sea fish or shellfish are grown in sea-water farms

marine *adjective* referring to the sea; **marine animals or marine vegetation** = animals or plants which live in the sea; **seals and other marine mammals**; **marine park** = natural park created on the bottom of the sea (as on a tropical reef) where visitors go into observation chambers under the sea to look at the fish and plant life; **compare** OCEANARIUM

marl *noun* fine soil formed of a mixture of clay and lime, used for making bricks

marram grass *noun* type of grass which is planted on sand dunes to stabilize them and prevent them being extended by the wind

marsh *noun* area of permanently wet land and the plants which grow on it; **marsh gas** = methane

◇ **marshland** *noun* area of land covered with marsh

COMMENT: a marsh usually has a soil base, as opposed to a bog or fen which is composed of peat

marsupial *noun* type of Australian mammal with a pouch in which the young are carried

COMMENT: marsupials give birth to young at a much earlier stage of development than other mammals so that the young need to be protected in the mother's pouch for some months until they become able to look after themselves

mass *noun* (a) body of matter; **mass number** = all the protons and neutrons in the nucleus of an atom; **mass spectrometer** = device used in chemical analysis, which separates particles according to their masses; **critical mass** = minimum amount of fissile material which can produce a chain reaction (b) large quantity, such as a large number of people; **mass production** = manufacturing large quantities of products; **mass radiography** = taking X-ray photographs of large numbers of people to check for tuberculosis; **mass screening** = testing large numbers of people for the presence of a disease; **mass wasting** = downhill movement of weathered rock (such as a landslide)

◇ **massive** *adjective* very large; *in the accident some of the workers received massive doses of radiation*

mast *noun* (a) seeds of the beech tree (b) **mast cell** = large cell in connective tissue which carries histamine and reacts to allergens

material *noun* (a) matter which can be used to make something; **raw materials** = substances which are used to manufacture something (ore for making metals, wood for making furniture, etc.) (b) cloth

maturation *noun* becoming mature or fully developed; **maturation lagoon** = pond used in the final stages of sewage treatment

◇ **mature** *adjective* fully developed

◇ **maturing** *adjective* becoming mature

◇ **maturity** *noun* being fully developed

maximum *noun* the most allowed or the most possible; **maximum allowable concentration (MAC)** = largest amount of a pollutant which workers are allowed to be in contact with in their work environment; **maximum-minimum thermometer** = thermometer which shows the highest and lowest temperatures during a period; **maximum permissible dose** = highest amount of radiation which a person can be subjected to safely during a certain period; **maximum permissible level** = highest level of radiation which is allowed to be present in a certain environment

meadow *noun* field of grass and other wild plants, grown for fodder; **water meadow** = meadow close to a river, which can be flooded

mean *adjective & noun* average; *the temperature has been above the mean for the time of year; mean crop yields are down compared with last year; mean lethal dose* = dose of a drug which will kill half the animals on which it is tested; **mean temperatures** = average temperatures over a period of time

meander *noun* bend in the course of a river; **meander belt** = total width of the area covered by a river which meanders; *see also* OX-BOW LAKE

meat *noun* animal flesh which is eaten as food; **meat-eating animals** = carnivores or animals (such as the cat family) which eat almost exclusively meat

medical *adjective* (i) referring to the study of diseases; (ii) referring to treatment of disease which does not involve surgery; **medical assistance** = help provided by a nurse or by ambulancemen or by a member of the Red Cross, etc.

◇ **medication** *noun* (i) method of treatment by giving drugs to a patient; (ii) medicine or drug taken by a patient

◇ **medicine** *noun* (a) drug or preparation taken to treat a disease or condition (b) (i) study of diseases and how to cure or prevent them; (ii) study and treatment of diseases which does not involve surgery

◇ **medicinal** *adjective* referring to medicine or (substance) with healing properties; **medicinal herb** = herb which can be used to cure a disease

◇ **medicinally** *adverb* used as a medicine; *the herb can be used medicinally*

mega- *prefix* meaning large NOTE: the opposite is **micro-** NOTE: the prefix **mega-** is used in front of SI units to indicate one million **megawatt** = one million watts; **power plants with a capacity larger than 50 megawatts**

megalo- *prefix* meaning abnormally large
◇ **megalopolis** *noun* agglomeration of several small towns into one huge urban area

meiosis or *US miosis* *noun* process of cell division which results in two pairs of cells each with only one set of chromosomes; compare MITOSIS

melanin *noun* dark pigment which gives colour to skin and hair

◇ **melanism** *noun* abnormal deposits of dark pigment on the skin; **industrial melanism** = phenomenon where certain animals (such as butterflies and moths) become darker in colour in industrial areas allowing them to match the trees and leaves which are covered with soot

COMMENT: because dark animals are better camouflaged in the sooty environment, they can avoid predators better than lighter ones. They therefore increase in number and eventually outnumber the lighter-coloured animals

melanoma *noun* tumour formed of dark pigment cells, caused by exposure to sunlight; *cases of melanoma could rise by between 5 and 7 per cent for each percentage decrease in ozone in the atmosphere*

melt *verb* (i) to heat a solid so that it becomes liquid; (ii) (of liquid) to become liquid after being heated; *the gradual rise in air temperature made the glaciers melt or melted the glaciers*; **melting point** = temperature at which a solid turns to liquid; *the melting point of ice is 0°C see also MOLTEN*

◇ **meltdown** *noun* point in an accident in a nuclear reactor, where the fuel overheats and the core melts while the nuclear reaction is still in progress

◇ **meltwater** *noun* water from melting ice, especially from a glacier or from winter snow

membrane *noun* thin layer of tissue covering an organ

Mendel's laws *noun* laws governing heredity

COMMENT: the two laws set out by Georg Mendel following his experiments growing peas, were (in modern terms): that genes for separate genetic characters assort independently of each other, and that the genes for a pair of genetic characters are carried by different gametes

menstruation *noun* bleeding from the uterus which occurs in a woman each month when the lining of the womb is shed because no fertilized egg is implanted in it

◇ **menstrual** *adjective* referring to menstruation; **menstrual cycle** = period (usually about 28 days) during which a woman ovulates, then the walls of the uterus swell and bleeding takes place if the ovum has not been fertilized

Mercalli *see* MODIFIED MERCALLI SCALE

mercury *noun* poisonous liquid metal, used in thermometers and electric batteries; **mercury barometer** = barometer made of a glass tube containing mercury with one end sealed and the open end resting in a bowl of mercury (the column of mercury rises and falls in the tube according to changes in the atmospheric pressure); **mercury poisoning** = poisoning by drinking mercury or mercury compounds or by inhaling mercury vapour NOTE: the chemical symbol is Hg; atomic number is 80

meridian *noun* imaginary line in the sky running from the North Pole to the South Pole, at right angles to the celestial equator

meridional *adjective* going from the North Pole to the South Pole or from the South to the North; **meridional airstream** = airstream blowing from north to south or from south to north

◇ **meridionaliety** *noun* phenomenon of air which blows from north to south or from south to north

mes- or **meso-** *prefix* meaning middle

mesa *noun* high plateau (in the south west of the USA)

mesobenthos *noun* animals or plants living on the seabed, between 250 and 1,000 metres below the surface

◇ **mesoclimate** *noun* variant of climate only found in a certain locality, no more than several kilometres in radius

◇ **mesohaline** *adjective* (water) which is partly salt, but less so than polyhaline water

◇ **mesopause** *noun* thin layer of atmosphere between the mesosphere and the thermosphere (in which the jetstream blows)

◇ **mesophyll** *noun* tissue inside a leaf

◇ **mesophyte** *noun* plant which needs a normal amount of water to survive

◇ **mesoplankton** *noun* organisms which take the form of plankton for part of their life cycle

◇ **mesosaprobic** *adjective* (animal or organism) which can survive in moderately polluted water

◇ **mesosphere** *noun* zone of the earth's atmosphere between the stratosphere and the thermosphere (i.e. between 50 and 80 kilometres above the surface, with the stratopause at the bottom and the mesopause at the top: the air temperature falls steadily as one rises through the mesosphere)

◇ **mesothelium** *noun* layer of cells lining a membrane; *see also* ENDOTHELIUM, EPITHELIUM

◇ **mesotherm** *noun* plant which grows in warm conditions

◇ **mesotrophic** *adjective* referring to water containing a normal amount of nutrient; **mesotrophic lake** = lake which is between the oligotrophic and the richer eutrophic state, and which has a moderate amount of nutrients in its water

meta- *prefix* meaning which changes or which follows

◇ **metabolism** *noun* chemical processes which are continually taking place in organisms and which are essential to life; **basal metabolism** = energy used by a body at rest (i.e. energy needed to keep the body functioning and the temperature normal)

◇ **metabolic** *adjective* referring to metabolism; **basal metabolic rate (BMR)** = rate at which a body uses energy when at rest; **metabolic cycle** = cycle by which plants absorb sunlight, transform it into energy by photosynthesis and create carbon compounds

◇ **metabolize** *verb* to change the nature of something by metabolism; **the liver metabolizes proteins and carbohydrates**

COMMENT: metabolism covers all changes which take place in an organism: the building of tissue (anabolism); the breaking down of tissue (catabolism); the conversion of nutrients into tissue; the elimination of waste matter; the action of hormones, etc.

metal *noun* material (either an element or a compound) which can carry heat and electricity (some metals are essential for life)

◇ **metallic** *adjective* like a metal or referring to a metal; **metallic element** = chemical element which is a metal

metalddehyde *noun* substance, sold in small blocks, used to light fires or to kill slugs and snails

metalimnion *noun* middle layer of water in a lake, between the epilimnion and the hypolimnion

metamorphic *adjective* (rock, such as marble) which has changed because of external influences (such as pressure from other rocks, temperature changes, etc.)

◇ **metamorphism** *noun* creation of metamorphic rock

metamorphosis *noun* change, especially the change of a larva into an adult insect

meteor *noun* solid body which enters the earth's atmosphere from outer space, usually burning up as it does so

◇ **meteoric** *adjective* (rainwater) which has reached the water table

◇ **meteorite** *noun* solid body which falls from outer space onto the earth's surface

COMMENT: outer space contains many millions of small solid bodies which sometimes come into contact with the earth. Large meteorites can create craters and form dust clouds when they hit the earth, and it is believed that very large meteorites hitting the earth at some time during its past history may have been responsible for major climatic changes

meteorology *noun* science of studying the atmosphere and weather

◇ **meteorological** *adjective* referring to meteorology or to the climate; **the Meteorological Office** = central government office which analyses weather reports and forecasts the weather

◇ **meteorologist** *noun* scientist who specializes in the study of the weather

meter *1 noun* device for counting or measuring; **hundreds of power workers will be asked to carry radiation meters**; **electric meter** or **gas meter** or **water meter** = device which records how much electricity or gas or water has been used *2 verb* to count or measure with a meter

methaemoglobin *noun* dark brown substance formed from haemoglobin which develops during illness or following treatment with certain drugs

COMMENT: methaemoglobin cannot transport oxygen round the body, and so causes cyanosis

◇ **methaemoglobinaemia** *noun* presence of methaemoglobin in the blood

methane (CH₄) *noun* marsh gas, colourless gas, produced naturally from rotting organic waste and also found in coal mines where it is called firedamp; **methane converter** = process which takes the gas produced by rotting waste in landfill sites and processes it into a usable form

QUOTE the principal sources of methane are - enteric fermentation in livestock and insects, ricefields and natural wetlands, biomass burning, landfills and gas and coal fields

Nature
QUOTE people are worried about the possible escapes of methane gas should the tip be established

Environment Now

COMMENT: methane is produced naturally from rotting vegetation in marshes, where it can sometimes catch fire, creating the phenomenon called will o' the wisp, a light flickering over a marsh. It occurs more widely as the product of animal excreta (in cattle farming). Excreta from cattle can be passed into tanks where methane is extracted leaving the slurry which is then used as fertilizer. The methane can be used for heating or as a power source. Methane is also a greenhouse gas, and it has been suggested that methane from rotting vegetation, from cattle excreta, from water in paddy fields, and even from termites' nests, all contribute to the greenhouse effect

methanol *noun* alcohol ($\text{CH}_3 \text{ OH}$) manufactured from coal, natural gas or waste wood, which can be used as fuel

COMMENT: methanol can be used as a fuel in any type of burner; its main disadvantage is that it is less efficient than petrol and can cause pollution if it escapes into the environment as it mixes easily with water. Production of methanol from coal or natural gas, does not help fuel conservation, since it depletes the earth's fossil fuel resources

methyl alcohol *noun* methanol, wood alcohol

◇ **methyated spirits** *noun* almost pure alcohol, with wood alcohol and colouring added

◇ **methylene blue** *noun* blue dye; **methylene blue test** = test to see if a sample of effluent has the ability to remain in an oxidized condition (i.e. stable), by treating it with methylene blue over a period of time. The effluent is considered stable if it retains the blue colour of the dye throughout the testing period

◇ **methyl isocyanate (MIC)** *noun* compound used in the production of insecticides

COMMENT: MIC is a very lethal gas and was the gas which leaked at Bhopal in India in 1984

metre or **US meter** *noun* base SI unit of length

NOTE: with figures **metre** is usually written **m**: 1.3m

◇ **metric system** *noun* decimal measuring system (such as the SI system), which is calculated in units of ten

metropolis *noun* very large town, usually the capital of a country

◇ **metropolitan** *adjective* referring to a large town; *smog covered the whole metropolitan area*

Mg *chemical symbol* for magnesium

mg *abbreviation* milligram

MHD = MAGNETOHYDRODYNAMICS

MIC = METHYL ISOCYANATE

mica *noun* silicate mineral which splits into thin transparent flakes, used as an insulator in electrical appliances

micro- *prefix (a)* meaning very small **NOTE:** the opposite is **macro-** or **mega-** or **megalo-** **Note** also that the prefix **micro-** is used in front of SI units to indicate a one millionth part; **microsecond** = one millionth of a second

microbe or **microorganism** *noun* very small organism which can only be seen with a microscope (viruses, bacteria, protozoa and fungi are all forms of microbe)

◇ **microbial** *adjective* referring to microbes; **microbial disease** = disease caused by a microbe; **microbial ecology** = study of the way in which microbes develop in nature

◇ **microbiological** *adjective* referring to microbiology

◇ **microbiologist** *noun* scientist who specializes in the study of microorganisms

◇ **microbiology** *noun* scientific study of microorganisms

QUOTE nitrates and organic matter from dead and decaying vegetation and from animal droppings, stimulate microbial activity in the soil

New Scientist

microclimate *noun* climate found in a very small locality, such as a pond or a tree or a field; *compare* **MACROCLIMATE**

◇ **microhabitat** *noun* single small habitat

◇ **micrometer** *noun* instrument for taking very small measurements, such as measuring the width or thickness of very thin pieces of metal, etc.

◇ **micrometre** or **micron** *noun* measurement of length, one thousandth of a millimetre **NOTE:** usually written μ with figures: 25 μ

◇ **micronutrient** *noun* substance (such as iron, zinc, copper, etc.) which organisms only need in very small quantities

microorganism or **microbe** *noun* very small organism which can only be seen with a microscope (viruses, bacteria and fungi are forms of microorganism)

microplankton *noun* very small plankton

◇ **micropollutant** *noun* pollutant which exists in very small traces in water

microscope *noun* scientific instrument with lenses, which makes very small objects appear larger; *the tissue was examined under the microscope; under the microscope it was possible to see the pollen particles*

COMMENT: in an ordinary or light microscope, the image is magnified by lenses; an electron microscope uses a beam of electrons instead of light, and so achieves much greater magnification

◇ **microscopic** *adjective* so small that it can only be seen through a microscope

◇ **microscopy** *noun* science of the use of microscopes

microtherm *noun* plant which grows in cool regions

mid- *prefix* meaning middle; **mid-latitudes** = areas halfway between the poles and the equator; *in the mid-latitudes, global warming would produce dry hot summers and mild winters*; **mid-ocean ridge** = ridge running down the middle of an ocean, such as the Atlantic, caused by the upward movement of magma

migrate *verb* (a) (of animal or birds) to move from one place to another with the seasons; *as winter approaches, the herds of deer migrate south* (b) to move to another place; *waste materials are allowed to migrate from landfill sites into the surrounding soil*

◇ **migrant** *noun* (a) bird which migrates from one region to another according to the seasons (b) worker who moves from country to another to find work; *compare* NOMAD

◇ **migration** *noun* movement of large numbers of animals from one place to another according to the seasons; *the islands lie along one of the main migration routes from Siberia to Australia*

◇ **migratory** *adjective* (animal or bird) which migrates each year; *estuaries are important feeding grounds for migratory birds, and are also important for the passage of migratory fish like salmon*

COMMENT: some examples of migration: birds (such as swallows) which breed in Northern Europe but which fly south for the winter; fish (such as salmon or eels) which spawn in one place, often a river, and then migrate to the sea after spawning

mildew *noun* fungus which produces a fine powdery film on the surface of an organism

mill *noun* factory where a substance is crushed to make powder, especially one for making flour from the dried seeds of corn; **papermill** = factory for making paper out of crushed wood pulp; **watermill** or **windmill** = mills driven by water or wind; **mill race** = channel of water which turns the wheel of a watermill; **mill**

wheel = large wheel (with wooden bars) which is turned by the force of water

millet *noun* common cereal crop grown in warm regions

milli- *prefix* meaning one thousandth

◇ **millibar** *noun* measurement of atmospheric pressure, used in meteorology and in drawing weather maps; *see also* ISOBAR

◇ **milligauss** *noun* measurement of magnetic flux density; *a person living under a low-voltage power line is exposed to 20 milligauss of radiation*

◇ **milligram (mg)** *noun* measure of weight, one thousandth of a gram

◇ **millilitre (ml)** *noun* measure of liquid, one thousandth of a litre

◇ **millimetre (mm)** *noun* measure of length, one thousandth of a metre

◇ **millisievert (mSv)** *noun* measure of radiation; **millisievert/year (mSv/year)** = number of millisieverts per year

QUOTE radiation limits for workers should be cut from 50 to 5 millisieverts, and those for members of the public from 5 to 0.25

Guardian

million tonnes of coal equivalent (MTCE) *noun* measure of energy from a source which is not coal; *renewable energy can provide up to 50 MTCE per annum*

mimic 1 *noun* animal which imitates another; *starlings are excellent mimics 2 verb* to imitate (another animal); *the starling mimicked the call of the thrush*

◇ **mimicry** *noun* situation where an animal imitates another, to prevent itself from being attacked

COMMENT: some animals mimic others which are unpleasant or poisonous so that predators will not try to eat them (Batesian mimicry); other animals mimic animals which are as unpleasant to eat as themselves (Mullerian mimicry). In some animals, mimicry is a form of camouflage: insects mimic sticks or leaves so that predators cannot see them clearly

Minamata disease *noun* form of mercury poisoning from eating polluted fish, found first in Japan

mine 1 *noun* hole dug in the ground to extract minerals; **coal mine** or **gold mine** = mine dug to extract coal or gold **2 verb** to dig into the ground to extract a mineral; **surface mining** = removing minerals by cutting or digging them from the surface of the ground; **strip mining** = method of surface mining on a slope, where the soil or rock which has been cut away is pushed down the slope to expose the mineral beneath

mineral *noun* inorganic solid substance which is found in nature; **mineral deposits** = deposits of rocks containing useful minerals; **mineral nutrients** = nutrients (except carbon, hydrogen and oxygen) which are inorganic and are absorbed by plants from the soil; **mineral oils** = oils which derive from petroleum and are made up of hydrocarbons; **mineral resources** = supply of minerals and metals which are necessary for the running of a country's economy, but not including natural resources such as wood or food plants; **mineral water** = water taken from a natural spring and sold in bottles

COMMENT: the most important minerals required by the body are: calcium (found in cheese, milk and green vegetables) which helps the growth of bones and encourages blood clotting; iron (found in bread and liver) which helps produce red blood cells; phosphorus (found in bread and fish) which helps in the growth of bones and the metabolism of fats; and iodine (found in fish) which is essential to the functioning of the thyroid gland

◇ **mineralization** *noun* breaking down of organic waste into its non-organic chemical components

minimum *noun* the smallest possible quantity; *the law provides only the minimum protection for workers*

◇ **minimal** *adjective* very small; **minimal area** = smallest area for sampling in which specimens of all species can be found

miosis *noun* US = MEIOSIS

mire *noun* wet land saturated with water, like bog or marsh

mist *noun* fine water droplets suspended in the air, which reduce visibility; **sea mist** = mist which forms over the sea

◇ **misty** *adjective* covered in mist; *a misty autumn morning*

COMMENT: usually mists form at night, when the temperature falls because the sky is clear. If visibility falls below 1,000 metres, the mist becomes a fog

misuse *verb* to use wrongly

QUOTE 50% of farms misuse the land or keep it fallow

Environmental Action

mite *noun* tiny animal of the spider family which may be free-living in the soil or parasitic on animals or plants

mitochondrion *noun* tiny rod-shaped part of a cell's cytoplasm responsible for cell respiration NOTE: plural is **mitochondria**

mitosis *noun* process of cell division, whereby a cell divides into two identical cells; *compare* MEIOSIS

mixed *adjective* made up of different elements, types, sexes, etc.; **mixed economy** = economic system which contains both nationalized industries and private enterprise; **mixed farming** = farming involving arable and dairy farming; **mixed woodland** = woodland containing conifers and deciduous trees

ml = MILLILITRE

mm = MILLIMETRE

Mn *chemical symbol* for manganese

Mo *chemical symbol* for molybdenum

moder *noun* humus which is partly acid mor and partly neutral mull

moderate *verb* to slow down the speed at which neutrons move in a nuclear reactor, so that the neutrons are more likely to hit a fissile atom

◇ **moderator** *noun* substance (such as graphite or heavy water) which is used to slow down the speed of the neutrons in a nuclear reactor

COMMENT: using a moderator allows fuel enriched with uranium-235 to be used in a reactor

Modified Mercalli Scale *noun* scale for measuring the damage caused by an earthquake

COMMENT: the scale runs as follows: 1: shock not felt; 2: shock felt by people on the top floors of houses, and light fittings swing; 3: noticed by many people, especially on the top floors of houses; 4: shocks very noticeable, with plates rattling in cupboards; 5: plaster on walls cracks and small delicate items get broken; 6: more damage, furniture moves, people run outside for safety; 7: ordinary buildings are slightly damaged, weak buildings are badly damaged; 8: even very strong buildings are damaged, and chimneys fall down; 9: cracks appear in the ground, most buildings are badly damaged; 10: floods and landslides occur, power lines are brought down, railways and roads damaged; 11: bridges and most buildings destroyed; 12: ground moves so strongly that objects are thrown into the air, and the whole area is completely devastated

Mohorovičić discontinuity *noun* boundary layer in the interior of the earth

between the crust and the mantle, below which seismic shocks move more rapidly

NOTE: sometimes called the **Moho** for short

mole *noun* (a) base SI unit of amount of a substance (b) small grey mammal which lives underground and which eats worms and insects

◇ **molehill** *noun* small heap of earth pushed up to the surface by a mole as it makes its tunnel

molecule *noun* smallest unit of a substance with at least two atoms

◇ **molecular** *adjective* referring to a molecule; **molecular biology** = study of the molecules which form the structure of living matter; **molecular weight** = weight of one molecule of a substance

mollusc *noun* any of many animals with soft bodies, usually living in shells; *slugs and snails are molluscs, as are oysters and other shellfish*

◇ **molluscicide** *noun* substance used to kill molluscs such as snails which spread Bilharzia

molten *adjective* which has become liquid with heat; **molten lava** = liquid rock and minerals which flows out of an erupting volcano; see also MELT

molybdenum *noun* metallic trace element, essential to biological life (it is used to make electric wiring)

NOTE: the chemical symbol is **Mo**; atomic number is 42

monitor 1 *noun* screen (like a TV screen) on a computer; **cardiac monitor** = instrument which checks the functioning of the heart in an intensive care unit **2** *verb* to check or to examine the progress of something; *scientists have been monitoring air pollution for the last ten years*

◇ **monitoring** *noun* regular examination and recording of a phenomenon; *scientists have set up a monitoring programme to check the changes in the sun's radiation*

QUOTE extensive environmental and human health monitoring must be carried out

Guardian

mono - *prefix* meaning single or one

◇ **monocline** *noun* rock formation where sedimentary rock slopes sharply on one side of a fold

◇ **monocotyledon** *noun* one of the two classifications of plants, a plant such as grass which has a single cotyledon (or seed leaf); compare COTYLEDON, DICOTYLEDON

◇ **monoculture** *noun* system of cultivation where only one crop is grown on the same piece of land over a period of years; **conifer monoculture** = system of afforestation where only one type of conifer is grown

NOTE: opposite is **mixed culture**

◇ **monogamy** *noun* breeding arrangement where a male and female mate for life; compare POLYGAMY

◇ **monoxide** see CARBON

◇ **monosodium glutamate (MSG)** *noun* substance (E621) added to processed food to enhance the flavour, but causing a reaction in hypersensitive people

monozygotic twins *noun* identical twins or two children born at the same time and from the same ovum, so exactly the same in appearance and sex

monsoon *noun* (a) season of wind and rain in tropical countries; **monsoon forest** = tropical rainforest in an area where rain falls during the monsoon season (b) wind which blows in opposite directions according to the season, especially the wind blowing north from the Indian Ocean in the summer

moon *noun* satellite of the earth, which orbits the earth every 27 days; **full moon** = middle point of a lunar cycle, when the whole face of the moon is lit by the sun; **new moon** = beginning of a lunar phase, when the moon's face is not lit by the sun

COMMENT: the moon always shows the same face to the earth, and shines with light reflected from the sun. As it moves round the earth, the face of the moon gradually becomes completely lit by the sun and is then said to be full. See also LUNAR PHASES. The moon exerts a gravitational pull on the earth and influences the tides

moor *noun* high land which is not cultivated, formed of acid soil covered with grass and low shrubs such as heather

◇ **moorland** *noun* area of land covered with moor

mor *noun* type of humus found under coniferous forests, which is acid and contains few nutrients

moraine *noun* deposit of soil and gravel left by a glacier

COMMENT: there are various types of moraine: ground moraine, which is a deposit left under a glacier; terminal moraine, which is the heap of soil and sand pushed by a glacier and left behind when it melts; lateral moraines are deposits left by the sides of a glacier as it moves forward

moratorium *noun* period when everyone agrees to stop a certain activity; *the*

government has called for a moratorium on nuclear testing; they voted to impose a ten-year moratorium on whale catching; the conference rejected a motion calling for a moratorium on nuclear reprocessing

morbidity rate *noun* number of cases of a disease per hundred thousand of population

morph *noun* an organism and its particular shape

morphology *noun* study of the structure and shape of living organisms; *see also* GEOMORPHOLOGY

mortality *noun* death; *the population count in spring is always lower than that in the autumn because of winter mortality; mortality rate* = number of deaths per year, shown per hundred thousand of population

mortar *noun* mixture of sand, cement and water, used to bind bricks together when building a wall; *see also* DRYSTONE WALL

mosaic *noun* virus disease of plants which makes spots on the leaves and can seriously affect some crops

mosquito *noun* insect which sucks blood and passes viruses or parasites into the bloodstream

COMMENT: in tropical countries, dengue, filariasis, malaria and yellow fever are transmitted in this way. Mosquitoes breed in water, and they spread rapidly in lakes or canals created by dams and other irrigation schemes. Because irrigation is more widely practised in tropical countries, mosquitoes are increasing and diseases such as malaria are spreading

moss *noun* very small plant without roots, which grows in damp places and forms mats of vegetation; **Irish moss** = CARRAGEENAN

moth *noun* insect of the order Lepidoptera, which flies generally at night

COMMENT: moths are similar to butterflies, but are dull in colour and lay their wings over their bodies when at rest

mother cell *noun* original cell that splits into daughter cells during mitosis

mould or **US mold** *noun* (a) any of various plants of the Kingdom Fungi; especially mildew, fungus which produces a fine powdery film on the surface of an organism (b) soft earth; **leaf mould** = soft fibrous material formed of rotten and broken-down dead organic matter such as leaves

moult 1 *noun* losing feathers or hair at a certain period of the year; **moult plumage** = small feathers which remain on a bird when it is moulting **2** *verb* to lose feathers or hair at a certain period of the year; **most animals moult at the beginning of summer; moulting season** = time of year when an animal or bird moults

mountain *noun* (a) mass of rock rising higher than a hill; **mountain sheep** = breeds of sheep which live on mountains; **mountain sickness or altitude sickness** = condition where a person suffers from oxygen deficiency from being at a high altitude (as on a mountain) where the level of oxygen in the air is low (b) large quantity of food stored because of overproduction; **a butter mountain; see also LAKE**

◇ **mountainous** *adjective* (area of land) where there are high mountains

◇ **mountainside** *noun* side of a mountain

mouth *noun* opening where a river joins the sea

MSG = MONOSODIUM GLUTAMATE

MTCE = MILLION TONNES OF COAL EQUIVALENT

mud *noun* very wet clay; **drilling mud** = mixture of mud, water and other minerals, used as a lubricant and coolant when drilling into rock; **mud volcano** = heap of hot mud thrown up round a hot spring

◇ **muddy** *adjective* covered with mud

◇ **mudflats** *noun* areas of flat mud, usually in river estuaries

mulch 1 *noun* organic material (such as dead leaves or straw) used to spread over the surface of the soil to prevent evaporation or erosion **2** *verb* to spread material (such as straw or dead leaves) over the surface of the soil to prevent evaporation

COMMENT: black plastic sheeting is often used by commercial horticulturists, but the commonest mulches are organic. Apart from preventing evaporation, mulches reduce weed growth and encourage worms

mull *noun* type of humus found under deciduous forests, with rotted leaves and many nutrients

Mullerian mimicry *noun* form of mimicry where a animal mimics another animal which has an equally unpleasant taste

municipal *adjective* referring to a town; **municipal dump** = place where a town's rubbish is disposed of after collection; **municipal refuse or municipal waste** = rubbish collected in a town

mushroom *noun* common edible fungus, often grown commercially

muskeg *noun* (mainly in Canada) bog in high cold plateau regions

mutant *noun & adjective* (i) gene in which mutation has occurred; (ii) organism carrying a mutant gene

◇ **mutagen** *noun* agent which can make genes mutate

◇ **mutate** *verb* to undergo a genetic change; *bacteria can mutate suddenly, and become increasingly able to infect*

◇ **mutation** *noun* change in the DNA which changes the gene

myc- or **myco-** *prefix* referring to fungus

◇ **mycelium** *noun* mass of threads which forms the main part of a fungus

◇ **Mycobacterium** *noun* one of a group of bacteria, including those which cause leprosy and tuberculosis

◇ **mycology** *noun* study of fungi

myiasis *noun* infestation of animals by the larvae of flies

Myrtaceae *noun* family of Australian plants, including the eucalyptus

Mysticeti *noun* baleen whales

myxomatosis *noun* usually fatal virus disease affecting rabbits, transmitted by fleas

Nn

N 1 *chemical symbol for nitrogen* 2 *abbreviation for newton*

Na *chemical symbol for sodium*

nacreous clouds *noun* thin clouds, possibly made of ice crystals, which form a layer about 25km above the earth, and look like 'mother of pearl'

nanoplankton *noun* very small plankton

nastic response *noun* response of plants and flowers to a stimulus which is not connected to the direction from which the stimulus comes, such as the closing of flowers at night

◇ **-nasty** *suffix* referring to a nastic response; **photonasty** = response of flowers to light (without turning towards the light source); **thermonasty** = response of flowers to heat
NOTE: opposed to **tropism** and **taxis** which are responses of flowers which move or turn towards the stimulus

natality *noun* birth; **natality rate** = birth rate, number of births per thousand of population

national park *noun* large area of unspoilt land, owned and managed by the government for people to enjoy; **National Nature Reserve** = (in the UK) a nature reserve designated by the Nature Conservancy Council for the protection of plants and animals living in it

native *adjective* which belongs to a place; **native element** = element which exists in a pure state in nature (such as gold or carbon); **native species** = species which exist naturally in a certain place (as opposed to introduced species)

nature *noun* (a) (i) essential quality of something; (ii) kind or sort; (iii) plants, animals and their environment in general; **nature conservation** = active management of natural resources to ensure their quality is maintained and that they are wisely used; **Nature Conservancy Council** = official body in the UK which is responsible for the conservation of nature; **nature reserve** = special area where the wildlife is protected; **nature study** = learning about plant and

animal life at school (b) **human nature** = general characteristics of humans

◇ **natural** *adjective* (a) normal or not surprising; *the animal's behaviour was quite natural*; *it's natural for wild animals to be frightened of people* (b) not made by people; (thing) which comes from nature; **natural childbirth** = childbirth where the mother is not given pain-killing drugs but is encouraged to give birth to the baby with as little medical assistance as possible; **natural evaporation** = evaporation of moisture from lakes and rivers caused by the wind or the sun; **natural history** = study of nature; **natural immunity** = immunity from disease inherited by newborn offspring from birth, acquired in the womb or from the mother's milk; **natural increase** = increase in population when births exceed deaths; **natural pollutant** = polluting substance (such as ash from a volcano) which occurs naturally; **natural resources** = part of the environment which can be used commercially (such as coal); **natural selection** = evolution of a species, whereby characteristics which help individual organisms to survive and reproduce are inherited and those characteristics which do not help are not passed on; **natural vegetation** = vegetation which exists in a natural state (such as a rainforest) and has not been planted or managed by people

◇ **naturalist** *noun* person who is interested in and studies natural history

◇ **naturalize** *verb* to introduce a species into an area where it has not lived before so that it becomes established as part of the ecosystem

◇ **natural gas** *noun* gas which is found in the earth and not manufactured

COMMENT: natural gas is often found near petroleum deposits, although it can occur without petroleum. It is mainly formed of methane, but also contains small amounts of butane and propane. It contains no sulphur (coal gas contains sulphur) and since it mixes with air it burns completely, creating very little carbon monoxide

nauplius *noun* swimming larva of a crustacean

nautical *adjective* referring to ships and the sea; **international nautical mile** = unit of measurement of distances at sea, equal to 1852 metres

neap tides *noun* tides which occur at the first and third quarters of the moon, when the difference between high and low water is less than normal; *compare* SPRING TIDES

Nearctic Region *noun* biogeographical region (part of Arctogeia) comprising North America and Greenland

needle *noun* (a) thin hard leaf of a conifer (b) thin pointer on a dial such as a compass

COMMENT: pine needles are covered with a waxy coating which prevents water loss and also stops diseases attacking the tree. Conifers reduce the water content in their needles as winter approaches

NEF = NOISE EXPOSURE FORECAST

negative feedback *noun* situation where the result of a process inhibits the action which caused the process

QUOTE the increases in the concentration of methane and carbon dioxide may have caused significant warming already, if negative feedback mechanisms such as cloud cover are ineffective

Nature

neighbourhood noise *noun* general noise from a local source (such as the noise of a factory) which is disturbing to people living in the area

nekton *noun* swimming marine animals (such as fish), as opposed to floating or drifting animals like plankton

nematode *noun* type of roundworm, some of which are parasites of animals, such as hookworms, while others live in the roots of plants

◇ **nematicide** *noun* substance which kills nematode worms

QUOTE root-knot nematodes are among the most widespread pests that limit agricultural productivity. Almost all plants that account for the majority of the world's food crop including the potato - are susceptible to these pests

Appropriate Technology

neo- *prefix* meaning new

◇ **neo-Darwinism** *noun* revised form of Darwin's theory of evolution which includes Mendel's laws of genetics and other more recent discoveries

◇ **Neogea or Neotropical Region** *noun* one of the main biogeographical regions of the earth comprising Central and South America together with the islands in the Caribbean; *see also* ARCTOGEA, NOTOGEA

neptunium *noun* natural radioactive element

NOTE: chemical symbol is **Np**; atomic number is **93**

neritic *adjective* (animal or plant) which lives in the shallow sea over the continental shelf; **neritic facies** = appearance of sedimentary rocks laid down in shallow water, where the ripples caused by waves are clearly visible; **neritic zone** = area of warm shallow water at the edge of a lake or sea, the habitat of plants and other organisms

nest **1** *noun* construction built by birds and some fish for their eggs; construction made by some social insects, such as ants and bees, for the colony to live in; *the birds have built a nest in the chimney*; *when the little birds are several weeks old they leave the nest* **2** *verb* to build a nest (in a place); *the robins have nested in an old kettle*; **nesting birds** = birds which are sitting on their eggs to incubate them; **nesting site** = place where a bird may build a nest

◇ **nestling** *noun* very small bird still in the nest

neurone or nerve cell *noun* cell in the nervous system which transmits nerve impulses; **sensory neurone** = sensory neurone which receives its stimulus directly from the receptor and passes the impulse to the sensory cortex

neutral *adjective* (a) neither acid nor alkali; *a pH factor of 7 is neutral* (b) neither positive nor negative

◇ **neutralize** *verb* (a) to make an acid neutral; *acid in drainage water can be neutralized by limestone*; *ammonia is produced in the nose to neutralize the effects of acid in the air* (b) to counteract the effect of something; *(in bacteriology) to make a toxin harmless by combining it with the correct amount of antitoxin*; *alkali poisoning can be neutralized by applying acid solution*

QUOTE alkaline soils, such as soils rich in limestone, can neutralize acid directly

Scientific American

neutron *noun* particle with no electric charge in the nucleus of an atom; *compare* ION

névé *noun* spring snow on high mountains which becomes harder and more like ice during the summer

newton *noun* SI unit of measurement of force NOTE: written **N** after figures: *the muscle exerted a force of 5N*

COMMENT: 1 newton is the force required to move 1 kilogram at the speed of 1 metre per second

NGO
ORGANIZATION

NON-GOVERNMENTAL

Ni *chemical symbol for nickel*

niacin *noun* nicotinic acid or vitamin of the vitamin B complex, found in milk, meat, liver, yeast, beans, peas and bread

niche *noun* place in an ecosystem which a species is specially adapted to fit; **ecological niche** = all the characters (chemical, physical, biological) that determine the position of an organism or species in an ecosystem (commonly called the "role" or "profession" of an organism, e.g. an aquatic predator, a terrestrial herbivore)

nickel *noun* metallic element, used in computer wiring

NOTE: chemical symbol is **Ni**; atomic number is 28

nicotine *noun* toxic substance in tobacco, also used as an insecticide

◇ **nicotinic acid** *noun* = NIACIN

nid- *prefix* meaning nest

◇ **nidicolous** *adjective* (baby bird) which is helpless and remains in the nest for some time

◇ **nidifugous** *adjective* (baby bird) which is so well developed when hatched that it can leave the nest immediately

night soil *noun* human excreta, collected and used for fertilizer in some parts of the world

NIH = NOT INVENTED HERE phrase used to criticize something which has not been locally manufactured, and therefore may not be suitable for the region

NIMBY = NOT IN MY BACKYARD phrase used to describe people who encourage the development of agricultural land for building houses or factories, provided it is not near where they themselves are living

El Niño *noun* (a) warm current flowing south along the Pacific coast of South America in December (b) phenomenon occurring every few years in the Pacific Ocean, where a mass of warm water moves from west to east, rising as it moves, giving very high tides along the Pacific coast of South America

QUOTE El Niño events are associated with general tropical tropospheric warming and occurrences of drought over large areas

New Scientist

QUOTE during an El Niño, which occurs roughly twice per decade but with extremely variable intensity, complex interactions of ocean currents, atmosphere and shifting precipitation belts produce droughts and other meteorological anomalies throughout the world for several months or even longer

Natural History

COMMENT: El Niño not only brings high tides, but also influences the rainfall patterns all around the Pacific basin, with most rain falling along the Pacific coast of South America, in South India and in the Pacific Islands, but making North India and Australia drier than usual. The phenomenon seems to occur as a cycle, every two to five years, and seems to be caused by fluctuations in the water of the Pacific Ocean itself, although some scientists have suggested it is connected with heavy snowfalls in Central Asia

nimbostratus *noun* grey mass of cloud with precipitation in the form of rain or snow about 1,000 metres above the ground

nitrate *noun* (i) ion with the formula NO_3^- ; (ii) chemical compound containing the nitrate ion, such as sodium nitrate

COMMENT: nitrates are a source of nitrogen for plants; they are used as fertilizers but can poison babies if they get into drinking water

◇ **nitrification** *noun* process by which bacteria found in the soil break down nitrogen compounds and form nitrates which plants can absorb

◇ **nitrify** *verb* to convert nitrogen to a nitrate; **nitrifying bacteria** = bacteria which convert nitrogen into nitrate

◇ **nitrite** *noun* (i) ion with the formula NO_2^- ; (ii) chemical compound containing the nitrite ion, such as sodium nitrite

COMMENT: nitrites are formed by bacteria from nitrogen as an intermediate stage in the formation of nitrates

nitrogen *noun* chemical element which is essential to biological life (a gas which is the main component of air and is an essential part of protein); **nitrogen cycle** = process by which nitrogen enters living organisms (the nitrogen is absorbed into green plants in the form of nitrates, the plants are then eaten by animals, and the nitrates are returned to the ecosystem through the animal's excreta or when an animal or a plant dies); **nitrogen dioxide** = one of the pollutant gases produced by car engines; **nitrogen fixation** = process by which nitrogen

in air is converted by bacteria in certain plants into nitrogen compounds, and when the plants die the nitrogen is released into the soil and acts as a fertilizer. NOTE: chemical symbol is N; atomic number is 7

COMMENT: nitrogen is taken into the body by digesting protein-rich foods; excess nitrogen is excreted in urine. When the intake of nitrogen and the excretion rate are equal, the body is in nitrogen balance or protein balance. The nitrogen cycle is the series of processes by which nitrogen is converted into nitrates which are absorbed into green plants. The plants are then eaten by animals, which themselves are eaten by other animals. The nitrates are returned to the ecosystem in excreta or when animals or plants die

nitrogen oxides (NO_x) *noun* oxides formed when nitrogen is oxidized, such as nitric or nitrous oxide (NO) or nitrogen dioxide (NO₂)

QUOTE NO_x and hydrocarbons can react in sunlight to form ozone

Environment Now

COMMENT: in general nitrogen oxides form the major part of air pollution, though nitric oxide (produced by burning fossil fuel) is not directly dangerous to humans. Nitrogen dioxide is produced by car engines and is toxic. Nitrogen oxides are also produced when farmland is sprayed with fertilizers; the bacteria in the soil feed on the fertilizer and produce the gas

noble gases *noun* inert gases (radon, helium, neon, argon, krypton and xenon) which do not react chemically with other substances; **noble metals** = metals such as gold or silver which resist corrosion and do not form compounds with non-metals (as opposed to base metals)

node *noun* point on the stem of a plant where a leaf is attached

noise *noun* any unpleasant sound; **noise criteria** = levels of noise which are acceptable to people who hear them; **noise exposure forecast (NEF)** = forecast of the effect which industrial or aircraft noise will have on people; **noise level** = loudness of a noise which can be measured; **the factory has announced plans to keep noise levels down to a minimum**; **neighbourhood noise** = general noise from a local source (such as noise of the factory) which is disturbing to people living in the area; **Noise Abatement Society** = association of people who try to influence others to reduce levels of noise; **noise pollution** = unpleasant sounds which cause discomfort; **noise zones** = areas which are identified according to the amount of noise

◇ **noisy** *adjective* which makes a loud noise

nomad *noun* person whose home is a large area of land, who moves from place to place in it without settling in any one spot (e.g. a person who hunts game or a herdsman who drives his animals from place to place to find grazing)

◇ **nomadic** *adjective* referring to nomads; **the herdsmen in the area lead a nomadic existence**; **nomadic pastoralists move their livestock around to feed on available grazing**

◇ **nomadism** *noun* habit of certain animals which move around from place to place without having a fixed habitat

non- *prefix* meaning not; **Non-Attainment Area** = area of the USA which does not meet the standards of clean air laid down in the Clean Air Act of 1970; **non-degradable** = (substance, like lead) which is not broken down in nature; **non-degradation** = preventing degradation of clean air; **non-governmental organization (NGO)** = organization (such as a charity) which is not funded by a government and which does official relief work; **non-nucleated** = (cell) with no nucleus; **non-organic** = (substance) which does not come from plants or animals; (compound) which does not contain carbon; **non-persistent** = (pesticide) which does not remain toxic for long so does not enter the food chain; **non-smoker** = person who does not smoke; **non-renewable resources** = natural resources (such as coal or oil) which cannot be replaced if they are consumed

north *noun & adjective* one of the directions on the earth's surface, the direction facing away from the sun at midday; **the wind is blowing from the north**; **the river flows north into the ocean**; **North Pole** = point which is furthest north on the earth, from which the lines of longitude run; **north wind** = wind blowing from the north

◇ **northerly** *adjective* to or from the north; **the cyclone moved in a northerly direction towards the coast**

◇ **northern** *adjective* in the north; towards the north; **Northern Lights** = Aurora Borealis, phenomenon when curtains of light are visible in the northern night sky, as ionized particles strike the atmosphere

◇ **North Sea** *noun* sea to the north of the Netherlands and Germany, east of the UK and west of Scandinavia; **effluent is discharged directly into the North Sea**; **North Sea oil or North Sea gas** = oil and gas extracted from the rocks under the North Sea

notify *verb* to inform someone officially; **the local doctor notified the Health Service of the case of cholera** NOTE: you notify someone of something

◇ **notifiable disease** *noun* serious infectious disease which in Great Britain has to be reported by a doctor to the Department of

Health and Social Security so that steps can be taken to stop it spreading

COMMENT: the following include notifiable diseases: cholera, diphtheria, dysentery, encephalitis, food poisoning, jaundice, meningitis, ophthalmia neonatorum, paratyphoid, plague, poliomyelitis, relapsing fever, scarlet fever, smallpox, tuberculosis, typhoid and typhus

Notogea *noun* Australasian Region, one of the main biogeographical regions of the earth, comprising Australia, New Zealand and the Pacific Islands ; *see also* ARCTOGAEA, NEOGEA

NO_x - NITROGEN OXIDES

noxious *adjective* harmful (drug or gas)

noy *noun* unit of measurement of perceived noise

Np *chemical symbol* for neptunium

NPK nitrogen, phosphorus and potassium used together as a fertilizer

NRC - NUCLEAR REGULATORY COMMISSION

nuclear *adjective* (a) referring to nuclei, especially referring to the fission or fusion of nuclei ; **nuclear energy** = energy created during a nuclear reaction; **nuclear fission** = splitting of the nucleus of an atom such as uranium-235 into several small nuclei, creating energy; **nuclear fuel** = substance which is fissile and can be used to create a controlled reaction in a reactor; **nuclear fuel cycle** = series of processes by which uranium ore is extracted, processed to make uranium oxide, then enriched until it is ready for use in a reactor; **nuclear fusion** = joining together of several nuclei to form a single large nucleus, creating energy (as in a hydrogen bombs); **nuclear power** = power generated by a nuclear power station; **nuclear plant** or **nuclear power station** = power station in which nuclear reactions are used to provide energy to run turbines; **nuclear reaction** = physical reaction of the nucleus of an atom, which when bombarded by radiation particles creates an isotope; **nuclear reactor** = device which creates heat and energy by starting and controlling atomic fission; *see also* REACTOR **US Nuclear Regulatory Commission (NRC)** = US government body which regulates and licenses nuclear plants; **nuclear waste** = radioactive waste from a nuclear reactor (including spent rods, coolant); **nuclear winter** = period which scientists believe will follow after a nuclear war, when there would be no warmth and light because dust particles would obscure the sun and most life would be affected by radiation (b) referring to a central

group; **nuclear family** = main family group formed of two parents and their offspring; *compare* EXTENDED FAMILY

◇ **nuclear-free** *adjective* with no nuclear reactors; *while some countries remain nuclear-free, nuclear reactors supply about 15% of all electricity generated in the world*; **nuclear-free zone** = area which will not allow the use of nuclear reactors or the use of nuclear weapons

nucleating agent *noun* substance (solid carbon dioxide) scattered on clouds to make them release rain

◇ **nucleic acids** *noun* organic acids combined with proteins (DNA or RNA) which exist in the nucleus and protoplasm of all cells

◇ **nucleus** *noun* (a) central core of an atom, formed of neutrons and protons (b) central body in a cell, containing DNA and RNA, and controlling the function and characteristics of the cell (c) centre, round which something gathers; **condensation nucleus** = particle on which moisture condenses, forming a raindrop; *moisture readily condenses on an existing surface, and sulphate particles are ideal condensation nuclei*

NOTE: the plural is **nuclei**

nuée ardente *noun* cloud of burning gas which flows downhill during a volcanic eruption

nuke *adjective* informal = NUCLEAR, NUCLEAR BOMB; **nuke waste** = nuclear waste

nursery *noun* place where plants are grown until they are large enough to be planted in their final positions

nut *noun* hard seed case of certain trees

nutrient *noun* substance (such as protein or fat or vitamin) in food which is necessary to provide energy or to help the body grow, repair and maintain itself; **nutrient stripping** = removal of nutrients from sewage to prevent eutrophication of water in reservoirs

QUOTE in the rainforest, despite the profusion of plants and trees, the underlying soils are poor, almost all the nutrients being bound up in the vegetation. Once the forests have been cut down, those few nutrients that remain in the soil are quickly washed away, transforming the land into a barren wasteland

Ecologist

QUOTE poor farmers burn patches of rainforest to release some of the nutrients locked in the biomass back into the soil, but those nutrients that are released are often exhausted after only one year of intensive agriculture

New Scientist

nutrition *noun* nourishment or food

◇ **nutritional** *adjective* referring to nutrition; *the nutritional quality of meat*; **nutritional disorder** = disorder (such as obesity) related to food and nutrients

◇ **nutritionist** *noun* dietitian, person who specializes in the study of nutrition and advises on diets

nyct- *prefix* referring to night

◇ **nyctonasty** *noun* response of flowers to darkness at night (most of them close)

nymph *noun* stage following the larval stage in certain flies, such as the dragonfly

Oo

O symbol for oxygen

oak *noun* common hardwood tree found in temperate regions

oasis *noun* place in an arid desert where the water table is near the surface and where vegetation can grow

oats *noun* cereal grown in northern temperate regions

obliterative shading *noun* grading of the colour of an animal which minimizes relief and gives a flat appearance (as when the back of the animal is dark shading towards a light belly)

occidental *adjective* referring to the west

occluded front or **occlusion** *noun* front where warm and cold air masses meet and mix together, with the warm air rising away from the surface of the ground

occupation *noun* job or work

◇ **occupational** *adjective* referring to work;
occupational disease = disease which is caused by the type of work or the conditions in which someone works (such as disease caused by dust or chemicals in a factory)

ocean *noun* large area of sea (there are four oceans: the Atlantic, the Pacific, the Indian and the Arctic); **ocean dumping** = discharging waste (solid or liquid or radioactive) into the ocean

◇ **oceanarium** *noun* type of large salt-water aquarium where marine animals are kept

◇ **oceanic** *adjective* referring to an ocean, especially referring to deep sea water beyond the continental shelf; **oceanic crust** = part of the earth's crust beneath the oceans; **oceanic organisms** = organisms which live in the ocean; **oceanic trench** = long deep valley in the floor of the ocean where two tectonic plates meet, usually associated with volcanic activity

octane *noun* hydrocarbon with the formula C_8H_{18} , found in petrol; *a car which runs on low octane petrol*; **octane rating** or **octane number** = method of classifying the quality and performance of petrol

COMMENT: petrol without the addition of hydrocarbons will make the engine knock. Hydrocarbons, such as octane or aromatic hydrocarbons, or lead tetraethyl, can be added to the petrol to give better performance, while increasing the octane rating. Unleaded petrol has a relatively low octane rating and leaded petrol (which contains an antiknock additive) has a high rating. Leaded petrol produces more atmospheric pollution than unleaded

Odontoceti *noun* toothed whales

ODP - OZONE-DEPLETING POTENTIAL

oe-

NOTE: words beginning with **oe-** are written **e-** in American English

oestrogen *noun* hormone produced in the ovaries of animals which stimulates the reproductive system; also produced in small amounts by the testis

COMMENT: synthetic oestrogens are used in most oral contraceptives and are also used in animal feeds and in the treatment of menstrual and menopausal disorders

offend *verb* to be unpleasant to someone

◇ **offensive** *adjective* unpleasant or which offends; **offensive industry** or **offensive trade** = trade (such as preparing leather) which causes very unpleasant smells

offpeak *adjective* (time) when electricity consumption is less; *offpeak electricity costs less; by using thermal storage we can move 50% of electricity demand into offpeak hours*

offshore *adjective & adverb* (a) away from the shore or in seawater near the coast; **offshore island** or **offshore oil platform** = island or platform situated a short distance (up to 20 miles) from a shore (b) **offshore wind** = wind which blows from the shore to the sea

oil *noun* (a) liquid which cannot be mixed with water (there are three types: fixed vegetable or animal oils; essential volatile oils; and mineral oils); **cod liver oil** = oil from the liver of the cod fish, which is rich in calories

and in vitamins A and D; **essential oils** = oils from scented plants used in cosmetics and as antiseptics; **fixed oil** = oil which is liquid at 20°C; **mineral oils** = oils which derive from petroleum and are made up of hydrocarbons (b) specifically, oil extracted from underground deposits, used to make petrol and other petroleum products; **oil industry** = industry which extracts and processes oil; **oil platform** = large construction which is positioned over an oil well in the sea, containing living quarters for workers and the pumping and drilling equipment; **oil pollution** = pollution with oil, such as pollution of the sea by oil from a damaged oil tanker; **oil pool** = reservoir of oil found under rock in the earth's surface; **oil rig** = large construction containing the pumping and drilling equipment for an oil well; **oil sands** = geological formation (found especially in Canada and the USSR) of sand mixed with bitumen, which can be extracted from the sand and processed to give oil; **oil shale** = geological formation of sedimentary rocks containing oil, which can be extracted by crushing and heating the rock; **oil slick** = oil which has escaped into water and floats on the surface; **oil spill** = escape of oil into the environment (as from a tanker which hits rocks or from a ruptured pipeline); **oil tanker** = large ship specially constructed for carrying oil

◇ **oilfield** *noun* area of rock under which one or more pools of oil lie, which can be exploited; *the search is on for new oilfields to replace fields which have been exhausted*

◇ **oily** *adjective* containing oil

okta *noun* unit of measurement of cloud cover, meaning one eighth of the sky area

COMMENT: to measure cloud cover, the sky is divided into imaginary sections, each covering one eighth of the total. A cloudless sky is 'zero oktas', and sky which is completely covered with clouds is 'eight oktas' or 'eight eighths'

olig- or **oligo-** *prefix* meaning few or little

◇ **oligohaline** *adjective* (water) which has traces of salt in it

◇ **oligosaprobic** *adjective* (fish, such as trout) which cannot survive in polluted water

◇ **oligotrophic** *adjective* (water) which contains few nutrients; **oligotrophic lake** = lake which has a balance between decaying vegetation and living organisms, where the lowest layer of water never loses its oxygen, and where the water contains few nutrients but sustains a fish population (typical of a young lake; over a period of time the lake will eutrophy and become richer in nutrients and also in algae); *compare* EUTROPHIC

QUOTE input of phosphates and other nutrients has been restricted for some time, with the aim of keeping the lake oligotrophic

Nature

olive *noun* Mediterranean tree, with fruit from which an edible oil can be produced

ombrogenous *adjective* which receives rain; (bog) which gets its water only from rain; (plant) which gets its nourishment only from rain

Ombudsman *noun* Parliamentary Commissioner or official who investigates complaints by the public against government departments or other large organizations

COMMENT: there are in fact several ombudsmen: the main one is the Parliamentary Commissioner, but there are also others, such as the Health Service Commissioner, who investigates complaints against the Health Service, and the Local Ombudsman who investigates complaints against local authorities. Although an ombudsman will make his recommendations to the department concerned, and may make his recommendations public, he has no power to enforce them. The Ombudsman may only investigate complaints which are addressed to him through an MP; the member of the public first brings his complaint to his MP, and if the MP cannot get satisfaction from the department against which the complaint is made, then the matter is passed to the Ombudsman

omnivore or **omnivorous animal** *noun* animal which eats anything, both vegetation and meat; *compare* CARNIVORE, HERBIVORE

onshore *adjective & adverb* (a) situated on land; **onshore oil installations** = plant for processing and handling oil, built on land (as opposed to offshore facilities) (b) towards the shore; **onshore wind** = wind which blows from the sea towards the shore

ooze 1 *noun* soft mud (especially at the bottom of a lake or the sea) 2 *verb* (of liquid) to flow slowly

opacity *noun* not allowing light to pass through

◇ **opaque** *adjective* not transparent; (substance) which does not allow light or other rays to pass through it; **radio-opaque dye** = liquid which is introduced into soft organs (such as the kidney) so that they show up clearly on an X-ray photograph

open *adjective* not closed; **open country** or **open land** = any large area of land which is not built over; **open countryside** = area of country without many trees or high mountains

◇ **open-air** *adjective* referring to the environment outside buildings

◇ **open burning** *noun* burning of waste matter in the open air creating pollution with smoke

open-cast mining *noun* form of coal mining where the coal is dug from the surface instead of digging underground to get it NOTE: also called **open-cut mining** or **strip mining**

COMMENT: open-cast mining damages the environment. The top layer of soil and rock is pushed away from the surface of the ground to expose the coal seam without digging underground, destroying the natural vegetation of the mined area and its surroundings. Unless the site is filled in and replanted when mining is completed the whole area remains devastated

opportunity *noun* chance or situation where something can be done successfully

◇ **opportunist** or **opportunistic** *adjective* (organism) which quickly colonizes an available habitat

orbit 1 *noun* curved path of a planet or satellite round the earth 2 *verb* to go round a planet in an orbit

◇ **orbital** *adjective* which moves in an orbit or which goes round; **orbital road** = road which goes right round a town, at some distance from the built-up areas; compare RING ROAD

order *noun* classification of animals or plants, formed of several families NOTE: orders of animals have names ending in -a; orders of plants have names ending in -ales

ore *noun* mineral found in the ground containing a metal which can be extracted from it; **iron ore deposits were found in the mountains; the ore is heated to a high temperature to extract the metal; ore body** = mass of ore which can be dug and processed

organ *noun* part of the body which is distinct from other parts and has a particular function (such as the liver or an eye or the ovaries, etc.); **critical organ** = part of the body which is particularly sensitive to radiation; **organ transplant** = transplanting of an organ from one person to another

◇ **organic** *adjective* (a) referring to organs in the body; **organic disorder** = disorder caused by changes in body tissue or in an organ (b) (i) (substance) which comes from an animal or plant; (ii) chemical compound which contains carbon (c) (food) which has been cultivated naturally, without any chemical fertilizers or pesticides; **organic farming** = method of farming which does not involve using chemical fertilizers or pesticides; **organic farming may become more economic than conventional farming**

◇ **organically** *adverb* (food) grown using natural fertilizers and not chemicals

COMMENT: organic farming uses natural fertilizers and rotates stock farming (i.e. raising of animals) with crop farming. Organic farming may produce lower yields than traditional or intensive farming, but the lower yields may be offset by the high cost of the chemical fertilizers used in intensive farming. In areas of overproduction, organic farming has the advantage of reducing crop production without loss of quality and without taking land out of agricultural use

organism *noun* any single living plant, animal, bacterium or fungus

organochlorine or **chlorinated hydrocarbon** *noun* any of several chemical compounds containing chlorine, used as an insecticide (such as aldrin, dieldrin, etc.)

COMMENT: organochlorine insecticides are very persistent, with a long half-life of up to 15 years, while organophosphorous insecticides have a much shorter life. Chlorinated hydrocarbon insecticides not only kill insects, but also enter the food chain and kill small animals and birds which feed on the insects

organophosphate or **organophosphorous insecticide** *noun* any of several synthetic chemical insecticides (such as malathion), based on chemical compounds including phosphate, which attack the nervous system but are not as persistent as the organochlorines

COMMENT: organophosphates are not persistent and so do not enter the food chain. They are, however, very toxic and need to be handled carefully, as breathing in their vapour may be fatal

organotherapy *noun* treatment of a disease by using an extract from the organ of an animal (such as using liver extract to treat anaemia)

◇ **organo-tin paint** *noun* antifouling paint (such as TBT) which is based on tin and is extremely toxic to organisms in the sea

oriental *adjective* referring to the east; **Oriental Region** = biogeographical region (part of Arctogeia) comprising the Indian subcontinent, South-East Asia, Indonesia and the Philippines

ornithology *noun* study of birds

◇ **ornithological** *adjective* referring to ornithology

◇ **ornithologist** *noun* scientist who studies birds

oscillation *noun* regular movement from side to side; **Southern Oscillation** = regular cycle by which air is exchanged between the Pacific basin and the area of the Indian Ocean, every two to five years, linked to changes in the sea temperature and to the El Niño effect

-osis *suffix* referring to disease

osmosis *noun* movement of a solution from one part through a semi-permeable membrane to another part, where enough of the molecules in solution pass through the membrane to make the two solutions balance

◇ **osmoreceptor** *noun* cell in the hypothalamus which checks the level of osmotic pressure in the blood and regulates the amount of water in the blood

◇ **osmotic pressure** *noun* pressure required to stop the flow of a solvent through a membrane

osteophony *noun* bone conduction, conduction of sound waves to the inner ear through the bones of the skull

outback *noun* (in Australia) large area of wild or semi-wild land in the centre of the continent; *many wild animals which used to live in the outback are becoming rare as the outback is reclaimed for farming*

◇ **outbreak** *noun* series of cases of a disease which start suddenly; *there is an outbreak of typhoid fever or a typhoid outbreak in the town*

◇ **outbreeding** *noun* breeding with other individuals who are not related NOTE: opposite is **inbreeding**

◇ **outcrop 1** *noun* area of rock which shows above the surface of the soil 2 *verb* (of rock) to stand out above the surface of the soil

outer *adjective* further away from the centre; *the outer coating of the seed is very hard; outer space* = area outside the earth's atmosphere in which the sun, stars and planets move

outfall (sewer) *noun* pipe which takes sewage (either raw or treated) and discharges it into a river or lake or the sea; *27% of outfalls discharge totally untreated sewage; sewage should be discharged through outfall pipes which are situated far enough from the shore*

QUOTE objectors claim a sea outfall pipe into the bay would spoil local shellfish, harm tourism and would be liable to damage by strong tidal action

Environment Now

outlet *noun* opening or channel through which something can go out

outwash *noun* water which flows from a melting glacier and creates deposits of silt called outwash fans or outwash deposits

ova *see* OVUM

over- *prefix* too much

◇ **overburden** *noun* soil and rock dug away from the surface of the land to expose a coal seam in strip mining

◇ **overcome** *verb* (a) to fight something and win; *they failed to overcome public opposition to the construction of a nuclear power station* (b) to make someone lose consciousness; *two people were overcome by smoke in the fire*

◇ **overcultivated** *adjective* (land) which has been too intensively cultivated and so is exhausted

◇ **overexploit** *verb* to cultivate soil or to work mineral deposits so much that they become exhausted; *we overexploit land in the same way as we overexploit the sea; irrigated land given over to cash crops can be overexploited*

◇ **overexploitation** *noun* action of exploiting land or resources too much; *overexploitation has reduced herring stocks by half*

◇ **overfish** *verb* to catch too many fish (in the sea or river, etc.) so that the fish become rare

◇ **overfishing** *noun* action of catching too many fish; *herring stocks have been reduced by overfishing*

◇ **overflow 1** *noun* excess liquid which flows over the edge of a container; *overflow pipe* = pipe attached to the top of a container to channel away excess liquid 2 *verb* to flow over the top of a container; *the floods made the reservoir overflow; the river overflowed its banks and flooded hundred of hectares of farmland*

◇ **overgraze** *verb* to graze a pasture so much that it is no longer rich enough to provide grazing for cattle

◇ **overgrazing** *noun* action of grazing a pasture so much that it loses nutrients; *overgrazing has led to soil erosion and desertification*

◇ **overproduction** *noun* producing too much; *beef mountains and wine lakes are caused by overproduction in the EC*

overshot wheel *noun* type of waterwheel where the water falls on the wheel from above (more efficient than the undershot wheel, where the water flows underneath the wheel)

◇ **overstorey or overwood** *noun* topmost vegetation layer in a forest formed by the highest trees

overuse 1 *noun* using something too much; *the overuse of pesticides is contaminating the rivers* 2 *verb* to use something too much; *farmers are warned against overusing chemical fertilizers*

oviparous *adjective* (animal) which carries and lays eggs; *compare VIVIPAROUS*

ovulate *verb* to release a mature ovum from an ovary

◇ **ovulation** *noun* release of an ovum from the ovary

◇ **ovum** *noun* an egg NOTE: the plural is **ova**

COMMENT: at regular intervals (in the human female, once a month) ova, or unfertilized eggs, leave the ovaries and move down the Fallopian tubes to the uterus; at the point where the Fallopian tubes join the uterus an ovum may be fertilized by a sperm cell

ox-bow lake *noun* curved lake, formed when a meander of a river becomes cut off from the main body of the river by silt

oxidase *noun* enzyme which encourages oxidation by removing hydrogen; *see also MONOAMINE*

◇ **oxidation** *noun* action of making oxides by combining with oxygen or removing hydrogen; **oxidation pond** = pond where

sewage is purified by allowing biochemical reactions to take place in it over a period of time

◇ **oxide** *noun* chemical compound formed with oxygen (such as carbon dioxide, nitric oxide, etc.)

◇ **oxidize** *verb* to form an oxide by the reaction of oxygen with another chemical substance; *under oxidizing conditions which exist in the tropical atmosphere, methane is converted into carbon dioxide*

QUOTE decaying vegetable matter, like raw sewage, does break down in water through the natural process of oxidation

Environment Now

COMMENT: carbon compounds form oxides when metabolized with oxygen in the body, producing carbon dioxide

oxygen *noun* chemical element, a common colourless gas which is present in the air, essential to biological life and is widespread in rocks NOTE: chemical symbol for oxygen is **O**; atomic number is 8

◇ **oxygenate** *verb* to treat (blood) with oxygen

◇ **oxygenation** *noun* becoming filled with oxygen

COMMENT: oxygen is an important constituent of living matter, as well as water and air. Oxygen is absorbed from the air into the bloodstream through the lungs and is carried to the tissues along the arteries; it is essential to normal metabolism. Oxygen is formed by plants from carbon dioxide in the atmosphere during photosynthesis and released back into the air

oxyhaemoglobin *noun* compound of haemoglobin and oxygen, which is the way oxygen is carried in arterial blood from the lungs to the tissues; *see also HAEMOGLOBIN*

◇ **oxyphobe** *noun* plant which cannot survive in acid soil

◇ **oxyphyte** *noun* plant which lives on acid soil

ozone (O_3) *noun* poisonous form of oxygen found naturally in the atmosphere, which is toxic to humans at concentrations above 0.1 parts per million; **ozone hole** = thin part or gap in the ozone layer, which forms over Antarctica each year at the end of winter; **ozone layer** = ozonosphere or layer of ozone in the atmosphere between 20 and 50 km above the surface of the earth; **ozone monitoring device** = device which measures the levels of ozone in the atmosphere

◇ **ozone-depleting potential (ODP)** *noun* measurement of the effect of a substance on ozone in the atmosphere; **CFC-12 has an ODP of one**

◇ **ozonosphere** *noun* the ozone layer or layer in the atmosphere between 20 and 50 km above the surface of the earth

QUOTE the ozone layer filters out ultraviolet radiation reaching Earth from the Sun. In the summer, the Sun's elevation is high and the amount of ultraviolet light that reaches the ground through the ozone hole will be much higher than in the early days of spring when the hole first forms

New Scientist

QUOTE while the natural layer of ozone in the upper atmosphere is critical to the preservation of earth-bound life, at ground level ozone forms when hydrocarbons and nitrogen oxides emitted by vehicles, factories, power plants and hundreds of other sources chemically react with sunlight

Environmental Action

COMMENT: ozone is created in the stratosphere by the effect of ultraviolet radiation from the sun on oxygen. Ozone also splits and becomes oxygen again as part of a continuous cycle of chemical change. It is destroyed by reaction with nitric oxide (created by burning fossil fuel) or water or chlorine compounds (from chlorofluorocarbons used in aerosols and packaging). The reduction of ozone in the stratosphere by any of these reactions creates a thin area or 'hole' in the ozone layer. The ozone layer in the stratosphere acts as a protection against the harmful effects of the sun's radiation, and the destruction or reduction of the layer has the effect of allowing more radiation to pass through the atmosphere with harmful effects (such as skin cancer) on humans. The first ozone hole was detected over Antarctica, but it is now suspected that others may be developing in other parts of the stratosphere. In the lower atmosphere, ozone is created by the effect of sunlight on hydrocarbons and nitrogen oxides released from burning fossil fuels. It is a major constituent of smog. The maximum amount of ozone which is considered safe for humans to breathe is 80 parts per billion. Even in lower concentrations it irritates the throat, makes people cough and gives headaches and asthma attacks similar to hay fever. At these lower levels ozone has a harmful effect on green plants and can kill trees such as conifers

Pp

P chemical symbol for phosphorus

pack *noun* (a) group of predatory animals (especially of the dog family, such as wolves, but also referring to animals such as killer whales which live and hunt together) (b) **pack ice** = large area of ice floating at sea consisting of a mixture of ice of various sizes and ages crushed together so that there is little or no open water

paddy or **padi** *noun* **paddy (field)** = field filled with water, in which rice is grown; **paddies** are breeding grounds for mosquitoes; *scientists believe that paddy fields contribute to the methane in the atmosphere*

PAH = POLYCYCLIC AROMATIC HYDROCARBON

paint *noun* liquid substance put on a surface to give it colour or to protect it; **antifouling (paint)** = special pesticide painted onto the bottom of a ship to prevent organisms growing on the hull, and which may be toxic enough to pollute seawater; **lead paint** = paint containing lead, which makes it more durable, but which is forbidden on children's toys and furniture

palae- or **palaeo-** *prefix* meaning ancient or prehistoric; **palaeobotany** = study of fossil plants; **palaeoecology** = study of the ecology of fossils; **palaeontology** = study of fossil organisms; **palaeozoology** = study of fossil animals

◇ **Palaeartic Region** *noun* biogeographical region (part of Arctogeia) covering Europe, North Asia and North Africa

◇ **palaeomagnetism** *noun* study of the magnetism of ancient rocks

COMMENT: rocks indicate the direction (and therefore the position) of the magnetic pole (which slowly changes its position over thousands of years) at the time the rocks were formed

palm *noun* large tropical plant like a tree with branching fern-like leaves, producing fruits which give oil and other foodstuffs; **coconut palm** or **date palm** = palms which produce coconuts or dates; **palm oil** = edible oil produced from the seed or fruit of a palm

paludism or **malaria** *noun* tropical disease caused by a parasite *Plasmodium* which enters the body after a bite from a mosquito

COMMENT: paludism is a recurrent disease which produces regular periods of shivering, vomiting, sweating and headaches; the patient also develops anaemia

palynology *noun* scientific study of pollen, especially of pollen found in peat and coal deposits

pampas *noun* wide grassy plains found in South America

pan *verb* to search for precious minerals by passing sandy deposits through a sieve in running water, allowing the smaller particles to be washed away

pan- *prefix* meaning generalized or affecting everything

◇ **pandemic** *noun & adjective* epidemic disease which affects many parts of the world; compare ENDEMIC, EPIDEMIC

panemone *noun* type of windmill, where flat surfaces spin round a vertical axis

panicle *noun* inflorescence where several small flowers branch from the same stem

para- *prefix* meaning (i) similar to or near; (ii) changed or beyond

paraffin *noun* oil produced from petroleum; it forms the base of some ointments and is also used for heating and light; **liquid paraffin** = oil used as a laxative

parallel *noun* imaginary line running round the earth, linking points at an equal distance from the equator

COMMENT: the parallels are numbered, and some of the main ones act as national boundaries: the 49th parallel marks most of the border between the USA and Canada

parameter *noun* characteristic of a population (such as mean height or mean wing length) for which a measurement is attempted

paraquat *noun* highly poisonous contact herbicide

parasite *noun* plant or animal which lives on or inside another organism (the host) and draws nourishment from it; **social parasite** = parasite which benefits from the host's normal behaviour (such as the cuckoo, which lays its eggs in the nests of other birds who bring up the cuckoo's young as if it were their own); see also **ECTOPARASITE**, **ENDOPARASITE**

◇ **parasitic** *adjective* referring to parasites; *a parasitic plant*

◇ **parasiticide** *noun & adjective* (substance) which kills parasites

◇ **parasitism** *noun* state in which one organism (the parasite) lives on another organism (the host) and derives its nourishment and other needs from it

◇ **parasitize** *verb* to live as a parasite on (another organism); *sheep are parasitized by flukes*

◇ **parasitoid** *noun* animal which is a parasite only at one stage in its development

◇ **parasitology** *noun* scientific study of parasites

QUOTE individual cuckoos specialize on particular hosts: some parasitize only reed warblers, others prefer pied wagtails

BBC Wildlife

COMMENT: the commonest parasites affecting animals are lice on the skin and various types of worms in the intestines. Many diseases of humans (such as malaria and amoebic dysentery) are caused by infestation with parasites. Viruses are parasites on animals, plants and even on bacteria

parcel *noun* (a) quantity of wood, either growing in a forest or felled, which is sold (b) parcel of air = large mass of air

parent *noun* mother or father; **parent cell** or **mother cell** = original cell which splits into daughter cells by mitosis

park *noun* area of open land used as a place of recreation; **country park** = area in the countryside set aside for the public to visit and enjoy; **business park** or **industrial park** or **science park** = area of land with buildings all specially constructed for business premises or light industries or science; **national park** = large area of unspoiled land, owned and managed by the government for recreational use by the public

part *noun* piece, one of the sections which make up a whole; **parts per million** or **parts per billion** (ppm or ppb) = measure of the concentration of a substance in a gas, liquid or solid; *the concentration of methane in the atmosphere now averages 1.56 ppm*

parthenogenesis *noun* reproduction by unfertilized ova (as in aphids)

partial *adjective* not complete or affecting only part of something; **partial eclipse** = eclipse where only part of the sun or moon is hidden

particle *noun* (a) very small piece of a substance; *particles of volcanic ash were carried into the upper atmosphere* (b) (in physics) part of an atom; **alpha particle** = nucleus of a helium atom which when emitted will pass through gas; **beta particle** = electron which will pass through thin substances such as sheets of metal; see also **RADIATION**

◇ **particulate** 1 *adjective* (i) referring to particles; (ii) made up of separate particles; *particulate matter in the atmosphere forms the nuclei around which raindrops form* 2 *noun* tiny solid particle of pollutant; **primary particulates** = particles of matter sent into the air from fires or from industrial processes or from volcanic eruptions or from sandstorms, etc.; **secondary particulates** = particles of matter formed in the air by chemical reactions such as smog

COMMENT: the finest particulates are the most dangerous as they are easily inhaled into the bronchioles in the lungs. Fine particulates from volcanic eruptions can enter the stratosphere and have a cooling effect by preventing the heat from the sun reaching the earth's surface (i.e. the opposite of the greenhouse effect)

passage *noun* (i) long narrow channel; (ii) moving from one place to another; **air passage** = tube which takes air to the lungs **birds of passage** = birds which migrate from one area to another, stopping for a short time before moving on

passerines or **Passeriformes** *noun* very large order of birds which perch in branches

passive *adjective* not active; **passive margin** = area at the edge of a continental shelf where there is no volcanic activity; compare **ACTIVE MARGIN**; **passive smoking** = inhaling cigarette smoke exhaled by other people

QUOTE from a scientific view there is now a consensus that passive smoking causes some cases of lung cancer

New Scientist

COMMENT: even though a person may never have smoked a cigarette, it is possible for him to develop lung cancer through being continuously in the presence of other people who are smoking

Pasteurella *noun* genus of parasitic bacteria, one of which causes the plague

◇ **pasteurization** *noun* heating of food or food products to destroy bacteria

◇ **pasteurize** *verb* to kill bacteria in food by heating it; *the government is telling people to drink only pasteurized milk*

COMMENT: Pasteurization is carried out by heating food for a short time at a lower temperature than that used for sterilization: the two methods used are heating to 72°C for fifteen seconds (the high temperature short time method) or to 65° for half an hour, and then cooling rapidly. This has the effect of killing tuberculosis bacteria

pastoral *adjective* (of land) available for pasture

◇ **pastoralist** *noun* farmer who keeps grazing animals on pasture; *the people most affected by the drought in the Sahara are nomadic pastoralists*

pasture 1 *noun* land covered with grass or other small plants, used by farmers as a feeding place for animals; *the cows are in the pasture or the cows are put to pasture*; alpine pastures = grass fields in high mountains which are used by cattle farmers in the summer 2 *verb* to put animals in a pasture; *their cows are pastured in fields high in the mountains*

◇ **pastureland** *noun* land which is given over to pasture

QUOTE scarcity of pastureland which cattle need in abundant quantities often leads to deforestation and hill erosion

Environmental Action

path- or **patho-** *prefix* referring to disease

◇ **pathogen** *noun* germ, virus, etc.; a microorganism which causes a disease

◇ **pathogenesis** *noun* origin or production or development of a disease

◇ **pathogenetic** *adjective* referring to pathogenesis

◇ **pathogenic** *adjective* which can cause or produce a disease; **pathogenic bacteria** or **organisms** = bacteria or organisms responsible for transmitting a disease

◇ **pathogenicity** *noun* ability of a pathogen to cause a disease

◇ **pathological** *adjective* referring to a disease or which is caused by a disease; which indicates a disease; **pathological waste** = waste (such as waste from a hospital) which may contain pathogens and which could cause disease

◇ **pathologist** *noun* (a) doctor who specializes in the study of diseases and the changes in the body caused by disease (b) doctor who examines dead bodies to find out the cause of death

◇ **pathology** *noun* study of diseases and the changes in structure and function which

diseases cause in the body; **clinical pathology** = study of disease as applied to treatment of patients; **pathology report** = report on tests carried out to find the cause of a disease

Pb *chemical symbol* for lead

PCB = POLYCHLOROBIPHENYL

peak *noun* (i) top of a mountain; (ii) high point on a graph or in a series of figures; *the annual rainfall has seasonal peaks and troughs*; **peak period** = time when most travellers are travelling or when most consumers are using electricity, etc.; see also OFFPEAK

pea-souper *noun* informal type of thick dark yellow fog caused by sulphur particles from burning coal, formerly common in London in the winter, but not seen since the 1960s

peat *noun* wet, partly-decayed mosses and other plants which form the soil of a bog

◇ **peatland** *noun* area of land covered with peat bog

◇ **peaty** *adjective* containing peat

COMMENT: peat can be cut and dried in blocks, which can then be used as fuel. In some countries there are peat-fired power stations. It is in fact an early form of coal, as coal is peat which has been compressed by layers of sediment until it becomes rock

pebble *noun* size of little rock, less than 64mm in diameter

pelagic *adjective* referring to the top and middle layers of sea water; **pelagic organisms** = organisms which live in open water or in the sea, but not on the bottom, or near the shore; **pelagic zone** = part of the sea which is open, and not near the shore, and not immediately above the seabed; compare DEMERSAL

penalty *noun* fine or other action taken to punish someone for doing something; *the government has imposed penalties on industrial concerns which emit too much pollution*

peneplain *noun* plain formed after mountains have been completely eroded

Penicillium *noun* fungus from which penicillin is derived

◇ **penicillin** *noun* common antibiotic produced from a fungus

COMMENT: penicillin is effective against many microbial diseases, but some people can be allergic to it, and this fact should be noted on medical record cards

peninsula *noun* long narrow piece of land, surrounded on three sides by sea

◇ **peninsular** *adjective* referring to a peninsula

pentad *noun* five-day period (used especially in meteorological forecasting and recording)

percolate *verb* to trickle slowly through a quantity of solid particles; **percolating filter** or **trickling filter** = filter bed through which liquid sewage is passed to purify it

QUOTE rainfall is limited in this part of Florida, and what rain does fall percolates rapidly through the white sand to a depth beyond the roots of the plants

Natural History

perennial 1 *adjective* which lasts for many years; **perennial agriculture** = system of agriculture (as in the tropics) where there is no winter and several crops can be grown on the same land each year 2 *adjective & noun* (plant) which lives for a long time, flowering each year without dying; compare ANNUAL, BIENNIAL

period *noun* length of time

◇ **periodic** *adjective* referring to periods or which occurs from time to time; **periodic table** = table of elements listed according to their atomic mass
see table in the SUPPLEMENT

peripheral *adjective* at the edge; **peripheral nerves** = pairs of motor and sensory nerves which branch out from the brain and spinal cord; **peripheral nervous system (PNS)** = all the nerves in different parts of the body which are linked and governed by the central nervous system

permanent *adjective* which exists always; **permanent hardness** = hardness of water, caused by calcium and magnesium, which remains even after the water has been boiled

◇ **permafrost** *noun* ground which is permanently frozen as in the Arctic regions, where the top layer of soil melts and softens in the summer while the soil beneath remains frozen

permeability *noun* (of a rock) ability to allow water to pass through; (of a membrane) ability to allow fluid containing chemical substances to pass through

◇ **permeable** *adjective* (rock) which allows a liquid to pass through; (membrane) which can allow substances dissolved in fluids to pass through

NOTE: US English is **pervious**

persist *verb* to continue for some time; to remain active for some time; *some substances persist in toxic forms in the air for weeks*

◇ **persistence** *noun* ability of a pollutant to remain active for a period of time

◇ **persistent** *adjective* which continues for some time; **persistent insecticide** = insecticide that remains toxic (either in the soil or in the body of an animal) and is passed from animal to animal through the food chain

NOTE: the opposite is **non-persistent**

QUOTE the persistence of very low ozone levels into the southern hemisphere's summer could have serious ecological effects
New Scientist

pervious *adjective* US (membrane) which can allow substances dissolved in fluids to pass through

NOTE: GB English is **permeable**

pest *noun* animal or plant which is troublesome or harmful to people, such as farmers; *a spray to remove insect pests*; **pest control** = the control of pests (by killing them)

COMMENT: the word is a relative term: a pest to one person may not be a pest to another, so foxes are pests to chicken farmers, but not to naturalists

pesticide *noun* substance which kills pests

COMMENT: there are three basic types of pesticide. 1. organochlorides, which have a high persistence in the environment of up to about 15 years (DDT, dieldrin and aldrin); 2. organophosphates, which have an intermediate persistence of several months (parathion, carbaryl and malathion); 3. carbamates, which have a low persistence of around two weeks (Tenik, Zectran and Zineb). Most pesticides are broad-spectrum, that is they kill all insects in a certain area and may kill other animals like birds and small mammals

PET = POLYETHYLENE TEREPHTHALATE

petal *noun* outer coloured part of the corolla of a flower

petrify *verb* to turn into stone; **petrified forest** = remains of trees which have been petrified and are found in other rocks

◇ **petrification** *noun* action of changing something into rock

petrochemicals *noun* chemicals derived from petroleum or natural gas; *the petrochemical industry* = industry which processes petroleum or natural gas and produces petrochemicals

petrol *noun* liquid, made from petroleum, used as a fuel in internal combustion engines; *the car is very economic on petrol; we are looking for a car with a low petrol consumption; petrol engine* = engine which uses petrol as a fuel

NOTE: US English is **gasoline**

COMMENT: in a petrol engine the petrol is mixed with air making it more combustible. It is then sprayed or injected into the cylinders, where it is ignited by an electric spark. Petrol is made of a mixture of several hydrocarbons, such as butane and benzene. It also contains additives, in particular lead tetraethyl, which prevent an engine from knocking. The use of petrol in vehicle engines is responsible for a high level of pollutants in the atmosphere, as the engines emit carbon monoxide and various lead compounds

petroleum *noun* mineral oil found in the ground; **crude petroleum** = raw petroleum which has not been processed; **petroleum exporting countries** = countries which produce petroleum and sell it to others; **petroleum industry** = industry which uses petroleum to make other products (petrol, soap, etc.); **petroleum products** = products (such as petrol, soap, paint) which are made from crude petroleum; **petroleum revenues** = income from selling oil

COMMENT: petroleum occurs usually in combination with natural gas or water, and when these are removed it is called crude oil. Refined crude oil gives various products such as petrol, LPG, diesel oil, paraffin wax, tar, etc.

petrology *noun* study of rocks and minerals
NOTE: not connected with **petrol**

PFBC = PRESSURIZED FLUIDIZED-BED COMBUSTION

pH *noun* measure of the concentration of hydrogen ions in a solution, which shows how acid or alkaline it is; *there was a sudden increase in pH; polluted water with a low pH value is more acid and corrosive; pH factor* = factor which indicates acidity or alkalinity; **pH meter** = meter which measures the pH value of a solution; **pH test** = test to see how acid or alkaline a solution is

QUOTE the sulphuric and nitric acids in cloud droplets can give them an extremely low pH. Water collected near the base of clouds in the eastern US during the summer typically has a pH of about 3.6 but values as low as 2.6 have been recorded. In the greater Los Angeles area the pH of fog has fallen as low as 2

Scientific American

COMMENT: the pH factor is shown as a number. A value of 7 is neutral. Lower values indicate increasing acidity and higher values indicate increasing alkalinity. So 0 is most acid and 14 is most alkaline. Acid rain has been known to have a pH of 2 or less, making it as acid as lemon juice. Most freshwater fish cannot survive even slightly acid conditions. Salmon and trout cannot stand a pH value of 6, and only pike can survive in water at less than pH4

Phaeophyta *noun* brown algae such as brown seaweed

phag- or **phago-** *prefix* referring to eating

◇ **-phage** *suffix* which eats

◇ **phagocyte** *noun* cell (such as a white blood cell) which can surround and destroy other cells, such as bacteria cells

◇ **phagocytic** *adjective* (i) referring to phagocytes; (ii) (cell) which destroys other cells

phase *noun* stage or period of development; *the larval phase of an insect; the phases of the moon* = the various stages which the moon's face appears to pass through every 29 days: first quarter, full moon, last quarter and new moon

phenomenon *noun* event that exists and is experienced; *chemical reactions in the atmosphere generate phenomena such as acid rain*

NOTE: plural is **phenomena**

phenotype *noun* physical characteristics of an organism which its genes produce, such as brown eyes, height, etc.; *compare* GENOTYPE

-philia *suffix* meaning attraction or liking for something

philoprogenitive *adjective* which produces many offspring

phosphate *noun* salt of phosphoric acid, which is an essential plant nutrient and which is formed naturally by weathering of rocks

COMMENT: phosphates escape into water from sewage, especially in waste water containing detergents, and encourage the growth of algae by eutrophication. Artificially produced phosphates are used in agriculture and known as superphosphates because they are highly concentrated

phosphorescence *noun* production of light with no heat, either caused by oxidation

of phosphorus (as in seawater) or generated by some animals such as glow-worms

◇ **phosphorescent** *adjective* which shines without producing heat

phosphoric acid *noun* acid which forms phosphates

◇ **phosphorus** *noun* toxic chemical element which is essential to biological life, being present in bones and nerve tissue (pure phosphorus will cause burns if it touches the skin and can poison if swallowed); **phosphorus cycle** = cycle by which phosphorus atoms are circulated through living organisms NOTE: the chemical symbol is **P**; atomic number is **15**

COMMENT: phosphorus is an essential part of DNA and RNA, and when an organism dies, the phosphorus contained in its tissues returns to the soil and is taken up by plants in the phosphorus cycle

phot- or **photo-** *prefix* referring to light

◇ **photic zone** or **euphotic zone** *noun* top layer of water in the sea or a lake, which can be penetrated by sunlight and in which photosynthesis takes place; *compare* APHOTIC

photochemistry *noun* study of chemical changes brought about by radiation

◇ **photochemical** *adjective* (chemical reaction) caused by light; *gases rise into the upper atmosphere and undergo photochemical change*; **photochemical oxidants** = substances (such as ozone) which are caused by chemical reactions with rays of light; **photochemical smog** = smog caused by the action of sunlight on polluting gases

COMMENT: when the atmosphere near ground level is polluted with nitrogen oxides from burning fossil fuels together with hydrocarbons, ultraviolet light from the sun sets off a series of reactions that result in photochemical smog, containing among other substances, ozone

photoconverter *noun* device which converts energy from light into electric energy

◇ **photoelectric cell** *noun* cell in which light that falls on the cell is converted to electricity

◇ **photogenic** *adjective* (i) which is produced by the action of light; (ii) which produces light

◇ **photograph** *noun* picture taken with a camera, which uses the chemical action of light on sensitive film; *aerial photographs of the area showed changes in land use*

◇ **photography** *noun* taking pictures with a camera

◇ **photonasty** *noun* response of plants to light

◇ **photo-oxidant** *noun* chemical compound produced by the effect of sunlight on nitrogen oxides and hydrocarbons

◇ **photo-oxidation** *noun* process of changing the chemical constitution of a compound by

the influence of sunlight; *photo-oxidation breaks down polluted air and converts the gases to sulphur dioxide*

◇ **photoperiodicity** *noun* way in which plants and animals react to changes in the length of the period of daylight from summer to winter

◇ **photorespiration** *noun* respiration in some types of plant which is activated by changes in light

◇ **photosensitive** *adjective* (skin or lens) which is sensitive to light or which is stimulated by light

◇ **photosensitivity** *noun* being sensitive to light

photosynthesis *noun* process by which green plants convert carbon dioxide and water into sugar and oxygen using sunlight as energy

◇ **photosynthesize** *verb* to carry out photosynthesis; *acid rain falling on trees reduces their ability to photosynthesize*

QUOTE light powers photosynthesis, the process by which a plant converts carbon dioxide and water into sugars, starch and oxygen

Scientific American

phototrophic *adjective* (organism) which obtains energy from sunlight

◇ **phototropic** *adjective* (plant or cell) which grows towards a stimulus of light

◇ **phototropism** *noun* growth towards light, found in certain types of plant

◇ **photovoltaic cell** *noun* device which converts the energy from light into electricity

COMMENT: as light strikes the cell, the electrons in it become mobile and create electricity

phreatic *adjective* referring to the water table; **phreatic gas** = gas produced when water comes into contact with magma; **phreatic water** = water in the layers of soil beneath the water table

◇ **phreatophyte** *noun* plant whose roots go down into the water table

phycology *noun* scientific study of algae

phylogeny *noun* evolution of a taxon of organisms

◇ **phylum** *noun* major subdivision in the classification of organisms, below kingdom

NOTE: plural is **phyla**

physi- or **physio-** *prefix* referring to (i) physiology; (ii) physical

physics *noun* scientific study of matter, including electricity, radiation, magnetism and other phenomena which do not change the chemical composition of matter

◇ **physical** *adjective* referring to matter or to the body; **physical geography** = geomorphology, the study of the physical features of the surface of the earth; **physical medicine** = branch of medicine which deals with physical disabilities or with treatment of disorders after they have been diagnosed

◇ **physically** *adverb* referring to the body; **an organism adapts physically to changes in temperature**

physiological *adjective* referring to physiology or to the normal functions of the body; **physiological specialization** = specialization whereby some members of a population appear to be identical in appearance but differ biochemically from each other

◇ **physiologist** *noun* scientist who specializes in the study of the functions of living organisms

◇ **physiology** *noun* scientific study of the functioning of the body of organisms; **human physiology** = study of the functions of the human body

phyt- or **phyto-** *prefix* referring to plants or coming from plants

◇ **phytobenthos** *noun* part of a stream or lake covered in plants

◇ **phytochemistry** *noun* study of the chemistry of plants

◇ **phytogeography** *noun* study of plants and their geographical distribution

◇ **phytome** *noun* a plant community

◇ **phytophagous** *adjective* herbivorous or (animal) which eats plants

phytoplankton *noun* microscopic plants which float in sea water; **phytoplankton blooms** = large masses of plankton which develop regularly at different periods of the year and float on the surface of the sea

QUOTE excess ultraviolet light is killing off phytoplankton, which is the primary source of the oceans' ecosystem

Guardian

COMMENT: phytoplankton are formed mainly of diatoms and carry out photosynthesis as other plants do under the influence of the sunlight which penetrates the surface of the sea. Phytoplankton are the basis of the food chain of all animals living in the sea

phytotoxic *adjective* (substance) which is poisonous to plants

◇ **phytotoxicant** *noun* substance which is poisonous to plants

◇ **phytotoxin** *noun* plant which is poisonous to animals

PIC = PRODUCT OF INCOMPLETE COMBUSTION

piezometric *adjective* (level) reached by water in a borehole or in a piezometer

◇ **piezometer** *noun* instrument for measuring water level (a tube is inserted into the ground and readings taken from it)

pig iron *noun* impure iron produced in a blast furnace and used to make purer forms of iron or steel

pigment *noun* substance which gives colour to part of the body such as blood or the skin or hair; **blood pigment** = HAEMOGLOBIN

◇ **pigmentation** *noun* colouring of the body, especially that produced by deposits of pigment

COMMENT: the body contains several substances which control colour: melanin gives dark colour to the skin and hair; bilirubin gives yellow colour to bile and urine; haemoglobin in the blood gives the skin a pink colour. Some pigment cells can carry oxygen and are called "respiratory pigments"

pilot project *noun* small-scale project which is carried out to see if a large-scale project will work; **they are running a pilot project in the area for three months before deciding on the next stage**

pine *noun* evergreen tree growing in temperate latitudes; **the north of the country is covered with pine forests**

◇ **pinewood** *noun* forest of pine trees

pisciculture *noun* fish-farming, the breeding fish for food in special enclosures

pitch *noun* (a) frequency of a sound (a low-pitched sound has a low frequency and a high-pitched sound has a high frequency) (b) dark sticky substance obtained from tar, used to make objects watertight

pituitary body or **pituitary gland** *noun* main endocrine gland in the body

COMMENT: the pituitary gland is about the size of a pea, and hangs down from the base of the brain. The front lobe of the gland secretes several hormones which stimulate the adrenal and thyroid glands, and stimulate the production of sex hormones, melanin and milk. The posterior lobe of the gland secretes the antidiuretic hormone and oxytocin. The pituitary gland is the most important gland in the body because the hormones it secretes control the functioning of the other glands

PJ = PICAJoule

placenta *noun* tissue which grows inside the uterus in mammals during pregnancy and links the embryo to the mother

◇ **placental** *adjective* referring to the placenta

COMMENT: The placenta allows an exchange of oxygen and nutrients to be passed from the mother to the embryo. It does not exist in marsupials

plagioclimax *noun* stage in the development of a plant ecosystem where the system is stable because of outside interference, as in managed woodlands

plague *noun* (a) infectious disease which occurs in epidemics where many organisms are killed; **bubonic plague** = fatal disease caused by *Pasteurella pestis* in the lymph system transmitted to humans by fleas from rats (b) widespread infestation by a pest; *a plague of locusts has invaded the region and is destroying crops*

COMMENT: bubonic plague was the Black Death of the Middle Ages; its symptoms are fever, delirium, prostration, rigor and swellings on the lymph nodes

plain *noun* level country with few trees

plan 1 *noun* (a) organized way of doing something; **contingency plan** = plan which will be put into action if something unexpected happens; **development plan** = plans drawn up by the government or by a council showing how an area will be developed over a long period (b) drawing which shows how something is arranged or how something will be built; **street plan** or **town plan** = map of a town showing streets and buildings 2 *verb* to organize carefully how something should be done

◇ **planned** *adjective* **planned economy** = economic system where the government plans all business activity

◇ **planner** *noun* (a) person who plans; the **government's economic planners** = people who plan the future economy of the country for the government; **town planner** = person who supervises the design of a town or the way the streets and buildings in a town are laid out and developed (b) **desk planner** or **wall planner** = book or chart which shows days or weeks or months so that the work of an office can be shown by diagrams

◇ **planning** *noun* (a) organizing how something should be done; **economic planning** = planning the future financial state of the country for the government; **manpower planning** = planning to get the right number of workers in each job (b) organizing how land and buildings are to be used; **planning authority** = local body which gives permission for changes to be made to existing buildings or

for new use of land; **planning controls** = legislation used by local authority to control building; **planning department** = section of a local government office which deals with requests for planning permission; **planning inquiry** = hearing before a government inspector relating to a decision of a local authority in planning matters; **planning permission** = official document allowing a person or company to plan new buildings on empty land or to alter existing buildings; **outline planning permission** = general permission to build a property on a piece of land, but not the final approval because there are no details given; *they have been refused planning permission; we are waiting for planning permission before we can start building; the land is to be sold with planning permission*

NOTE: no plural

QUOTE buildings are closely regulated by planning restrictions

Investors Chronicle

plane tree *noun* common temperate deciduous hardwood tree, frequently grown in towns because of its resistance to air pollution

planet *noun* large body in the solar system, such as the Earth, Mars, Mercury, etc.

◇ **planetary** *adjective* referring to the planets

plankton *noun* microscopic animals and plants which live and drift in water, and are eaten by many aquatic animals NOTE: the word is plural, and a single organism is a **plankter**

◇ **planktivorous** *adjective* (organism) which eats plankton

◇ **planktonic** *adjective* referring to plankton; *blooms are population explosions of planktonic plants*

COMMENT: plankton are divided into two groups: zooplankton, which are microscopic animals and phytoplankton which are microscopic plants, capable of photosynthesis. Plankton float near the surface of the water and provide food for many fish and other marine animals

plant *noun* (a) organism containing chlorophyll with which it carries out photosynthesis; *botanists discovered several new species of plant in the jungle* (b) very large factory; *a nuclear power plant is to be built near the town; the area was sealed off after leaks from the chemical plant*

plantation *noun* trees or shrubs planted in rows usually for commercial purposes; **coffee plantation** = plantation of coffee trees NOTE: plantations of conifers are often mistakenly called **forests**

QUOTE extensive cash crop plantation schemes such as rubber and oil palm estates form a vital part of the economy

Ecologist

plasma *noun* yellow watery liquid which makes up the main part of blood

Plasmodium *noun* type of parasite which infests red blood cells and causes malaria

plastic 1 *noun* artificial organic material made from petroleum and used to make many objects **2** *adjective* which can be taken on different shapes when under stress and does not return to its original shape when the stress is not longer there

COMMENT: plastics are shaped under pressure. Thermoplastics are heated while being shaped. All plastics retain their shape after being formed. Waste plastics containing chlorine can produce hydrogen chloride when incinerated. Those formed from ethylene or propylene (i.e. polyethylene and polypropylene) are not degradable and must be incinerated

plate *noun* flat piece of the earth's crust, underlying a continent and floating on the mantle; **plate tectonics** = theory that the earth's crust is made of a series of large plates of solid rock which float on the mantle and move very slowly, the places where they meet being subject to earthquakes and volcanic eruptions

plateau *noun* area of high flat land

NOTE: plural is **plateaux**

platinum *noun* metallic element, an important rare metal which does not corrode **NOTE:** chemical symbol is **Pt**; atomic number is 78

Pleistocene *noun* period in the earth's evolution which lasted until about ten thousand years ago, including the main Ice Ages

plough or **US plow 1** *noun* agricultural implement used to turn over the surface of soil in order to cultivate crops **2** *verb* to turn over the soil with a plough; **deep ploughing** = ploughing very deep into the soil (used when reclaiming previously virgin land for agricultural purposes)

plow *US* = PLOUGH

plug *noun* round block of igneous rock forming the central vent of an old volcanic opening

plumbism *noun* lead poisoning

plume *noun* (i) long cloud of smoke or gas from a factory chimney or volcano; (ii) cloud of powdered snow blowing from a mountain crest; *build a tall chimney stack so that the gas plume will be carried further by the wind; plumes from power stations can increase the levels of acid in clouds; the plume of radioactive material covered most of the country*

plutonium *noun* natural radioactive element, also made in nuclear reactors; **plutonium-239** = extremely poisonous and carcinogenic isotope of plutonium which is formed from uranium-238 and is itself used as a fuel in nuclear reactors

NOTE: the chemical symbol is **Pu**; atomic number is 94

PND = PERCEIVED NOISE LEVEL IN DECIBELS

pneum- or **pneumo-** *prefix* referring to air or to the lungs or to breathing

◇ **pneumoconiosis** *noun* lung disease where fibrous tissue forms in the lungs because the patient has inhaled particles of stone or dust over a long period of time

PNS = PERIPHERAL NERVOUS SYSTEM

Po *chemical symbol* for polonium

pod *noun* legume, casing for several seeds (as for peas or beans)

podocarpus *noun* common softwood tree in Australasia

podsol or **podzol** *noun* type of acid soil where oxides have been leached from the light-coloured top layer into a darker lower layer which is impervious and contains little organic matter; *compare* CHERNOZEM

◇ **podzolization** *noun* process by which oxides leach from the top layers of soil

poikilo- *prefix* meaning irregular or varied
◇ **poikilothermic** *adjective* (invertebrate) the osmosis of whose body fluids changes depending on the composition of the water surrounding it

◇ **poikilotherm** *noun* animal with cold blood or cold-blooded animal; *compare* HOMIOOTHERM

COMMENT: the body temperature of cold-blooded animals changes with the outside temperature

point *noun* (a) sharp end, such as the end of a piece of land jutting into the sea (b) dot used to show the division between whole numbers and parts of numbers (c) mark in a series of numbers; **frost point** = temperature where moisture in saturated air turns to ice; **melting**

point = temperature at which a solid turns to liquid; *what's the freezing point of water? the melting point of ice is 0°C* (d) **point quadrat** = device for measuring the leaf cover of ground, where a piece of wood with many holes in it is placed over a quadrat and rods passed through the holes, counting the number of leaves which they touch

poison 1 *noun* substance which can kill when eaten, drunk, breathed in or touched; **poison ivy** or **poison oak** = American plants whose leaves can cause a painful rash if touched 2 *verb* to give someone a poison; *the workers were poisoned by toxic fumes; the wound was poisoned by bacterial infection; hundreds of fish were poisoned by the runoff*

◇ **poisoning** *noun* condition where a person is made ill or is killed by a poisonous substance; **blood poisoning** = condition where bacteria are present in blood and cause illness; **Salmonella poisoning** = poisoning by *Salmonellae* which develop in the intestines; **staphylococcal poisoning** = poisoning by *staphylococci* in food

◇ **poisonous** or **toxic** *adjective* (substance) which is full of poison or which can kill or harm; *some mushrooms are good to eat and some are poisonous; poisonous gas* = gas which can kill or which can make someone ill

COMMENT: the commonest poisons, of which even a small amount can kill, are arsenic, cyanide and strychnine. Many common foods and drugs can be poisonous if taken in large doses. Common household materials such as bleach, glue and insecticides can also be poisonous. Some types of poisoning, such as *Salmonella*, can be passed to other people through lack of hygiene

polar *adjective* referring to the North or South Pole; **polar vortex** or **circumpolar vortex** = circular movement of air around one of the poles

polder *noun* piece of low-lying land which has been reclaimed from the sea, and is surrounded by earth banks

pole *noun* (a) end of an axis; one of two opposite points which are linked (b) one of two points (the North and South Poles) where longitudinal lines meet and which are the most northerly or southerly points on the Earth; **geomagnetic pole** or **magnetic pole** = one of the two axes of the earth (near to, but not identical with, the geographical poles) to which a compass points

pollard 1 *noun* tree of which the branches have been cut back to a height of about two metres above the ground 2 *verb* to cut back the branches on a tree every year, or every few

years, at a height of about two metres from the ground; *compare* COPPICE

COMMENT: pollarding allows new shoots to grow as in coppicing, but high enough above the ground to prevent them being eaten by animals. Willow trees are often pollarded

pollen *noun* cells in flowers which convey the male gametes; **pollen count** = measurement of the amount of pollen in a sample of air; **pollen analysis** = scientific study of pollen, especially of pollen found in peat or coal deposits; *see also* PALYNOLOGY

◇ **pollinate** *verb* to transfer pollen from male to female reproductive organs in a flower

◇ **pollination** *noun* action of pollinating a flower; **self-pollination** = pollination where the pollen from an anther goes to a stigma on the same plant; *see also* CROSS-POLLINATION

◇ **pollinator** *noun* organism such as a bee or bird or other plant, which helps pollinate a plant; *some apple trees need to be planted with pollinators as they are not self-fertile; birds are pollinators for many types of tropical plant*

◇ **pollinosis** or **hay fever** *noun* allergic reaction to pollen, when the nasal passage and eyes become inflamed

COMMENT: grains of pollen are released by trees in spring and by flowers and grasses during the summer. The pollen is released by the stamens of a flower and floats in the air until it finds a female flower. Pollen in the air is a major cause of hay fever. It enters the eyes and nose and releases chemicals which force histamines to be released by the sufferer, causing the symptoms of hay fever to appear

pollute *verb* to discharge harmful matter in abnormally high concentrations into the environment, often done by people but can occur naturally; *polluting gases react with the sun's rays; polluted soil must be removed and buried*

◇ **pollutant** *noun* substance or agent which pollutes; *discharge pipes take pollutants away from the coastal area into the sea*

◇ **polluter** *noun* person or company which pollutes; *certain industries are major polluters of the environment; polluter pays principle* = principle that if pollution occurs, the person or company responsible should be required to pay for consequences of the pollution

◇ **pollution** *noun* presence of abnormally high concentrations of harmful substances in the environment, often put there by people; *in terms of pollution, gas is by far the cleanest fuel; pollution of the atmosphere has increased over the last 50 years; soil pollution round mines poses a problem for land reclamation; atmospheric pollution* = pollution of the air

QUOTE the principle culprits of the area's serious pollution are the more than 2.5 million automobiles that discharge an estimated 80% of the 5 million tons of air pollutants that enter the city's skies each year

Environment

COMMENT: pollution is caused by natural sources or by human action. Pollution can be caused by a volcanic eruption or by a nuclear power station. Pollutants are not only chemical substances, but can be a noise or an unpleasant smell (as from a grinding works or from a sewage farm)

polonium *noun* natural radioactive element

NOTE: chemical symbol is **Po**, atomic number is 84

poly- *prefix* meaning many or much or touching many organs

polychlorinated biphenyls or **polychlorobiphenyls (PCBs)** *noun* compounds produced by chlorination of biphenyl

COMMENT: PCBs are stable compounds and were extensively used in electrical fittings and paints. Although they are no longer manufactured they are extremely persistent, and remain in huge quantities in the atmosphere and in landfill sites. They are not water soluble, and float on the surface of water where they are eaten by aquatic animals and so enter the food chain. PCBs are fat-soluble, and are therefore easy to take into the system, but difficult to excrete

polycondensed plastic *noun* type of plastic (such as nylon) which can be recycled
 ◇ **polycyclic aromatic hydrocarbons (PAHs)** *noun* group of chemical compounds which are carcinogenic

◇ **polyethylene terephthalate (PET)** *noun* type of plastic used to make artificial fibres and plastic bottles, which can be recycled

◇ **polygamy** *noun* breeding arrangement where a male has several mates; compare MONOGAMY

◇ **polymorphism** *noun* (i) existence of different forms during the life cycle of an organism (such as a butterfly, which exists as a caterpillar, then a pupa, before becoming a butterfly); (ii) existence of several forms of an organism (such as bees, which exist as workers, queens and drones)

polyp *noun* sedentary form of aquatic animals, such as sea anemones

polyphagous *adjective* (animal) which eats more than one type of food

◇ **polysaprobic** *adjective* (organism) which can survive in heavily polluted water

◇ **polythene** or **polyethylene** *noun* plastic used to make artificial fibres, wrappings and boxes

◇ **polyunsaturated fat** *noun* fatty acid capable of absorbing more hydrogen (typical of vegetable and fish oils)

◇ **polyvinylchloride (PVC)** *noun* plastic that is not biodegradable

pome *noun* type of fruit which develops from the axis of the flower

COMMENT: common fruit like apples and pears are pomes, in which the fleshy part develops from the receptacle of a flower and not from the ovary as in other fruit

◇ **pomology** *noun* study of growing fruit

pond *noun* small area of fresh water; see also DEW POND

◇ **pondweed** *noun* type of plant which exists in ponds

pool *noun* (a) small area of water; **rock pool** = pool of salt water left in rocks by the sea (b) pool of oil or gas which collects in porous sedimentary rocks

poor *adjective* not very good; **poor soil** = soil with few nutrients

population *noun* (a) number of organisms of the same species living and breeding in a certain area; **population cycle** = regular changes in the population of a species, usually a cycle in which the population gradually increases and then falls away again; **population ecology** = study of the size, growth and distribution of populations; **population equilibrium** = state where the population stays at the same level, because the number of deaths is the same as the number of births (b) number of people living in a country or town; **population statistics show that the birth rate is slowing down; the government has decided to screen the whole population of the area; population growth is a major threat to conservation efforts; population explosion** = sudden increase in the human population of the earth, growing more rapid over the years; **zero population growth** = point where the number of births and deaths are equal and the total population does not rise or fall

◇ **populate** *verb* to fill an area with organisms; **starlings introduced into the USA in the 19th century soon populated the whole eastern seaboard**

pore *noun* (i) tiny hole in the skin through which sweat passes; (ii) tiny space in a rock formation

porous *adjective* (i) containing pores; (ii) (rock) which has many small pores in it and can absorb water; (iii) (tissue) which allows fluid to pass through it; *porous rock is not necessarily permeable*

◇ **porosity** *noun* degree to which a substance is porous; *clay has a lower porosity than lighter soils*

positive *adjective* which shows the presence of something; **positive feedback** = situation where the result of a process stimulates the process which caused it (as when a change at one trophic level affects all levels above it)

◇ **positively** *adverb* in a positive way

post- *prefix* meaning after or later

◇ **postclimax** *noun* climax community still existing in a place where the environmental conditions are no longer suitable for it

potamous *adjective* (animal) which lives in water

potassium *noun* metallic element, essential to biological life NOTE: chemical symbol is K; atomic number is 19

◇ **potassium permanganate** *noun* purple-coloured salt, used as a disinfectant

potential *adjective* which may happen

◇ **potentiation** *noun* degree of probable increased damage caused by the synergism of toxic substances

◇ **potentiate** *verb* (of two substances) to increase each other's probable toxic effects

powder *noun* fine dry particles like dust

◇ **powdered** *adjective* crushed so that it forms a fine dry dust

◇ **powdery** *adjective* which looks like powder; *mildew forms as a powdery layer on leaves*

power *noun* energy which makes substances move; *the storm cut off power supplies to the town*; **power cables** or **power lines** = wires which take high tension electric current from a power station, carried across the countryside on pylons; **power raising** = action of starting up a power station; **nuclear power** = electricity produced in a nuclear power station; **wind power** or **wave power** or **tidal power** = electricity produced by turbines driven by the force of the wind or waves or tides

◇ **-powered** *suffix* meaning driven by; *a wind-powered pump; a nuclear-powered submarine*

COMMENT: it is believed by some scientists that living near or under high-tension power lines can affect people's health, causing headaches, depression and possibly cancer

power plant or **power station** *noun* building with machines which make electricity; **coal-fired** or **oil-fired power station** = station which produces electricity using coal or oil as fuel; **nuclear power station** = power station which produces electricity using nuclear fuel

COMMENT: a power station makes electricity by using steam to turn turbines, which themselves drive generators. High-pressure steam is heated by burning oil or coal, or by energy from a nuclear reactor. The steam passes over the turbines as a high-pressure jet, making the turbines rotate. The steam is produced from fresh water which is heated in a boiler, then passed through the furnace again to be superheated. Superheated steam drives the first turbine, and then is returned to the boiler again for reheating, and then passing over the second and third turbines. The steam is then condensed into water, which then passes back through the system again. Although the steam used in power stations is heated several times and is condensed into reusable water at the end of the cycle, much of the energy generated to heat the water and create steam is not translated into electric power and is therefore wasted

ppb = PARTS PER BILLION

ppm = PARTS PER MILLION

prairie *noun* area of grassy plain in North America, mainly treeless, with many different species of grasses and herbs

QUOTE within a lifetime, most of Canada's wild prairies have been lost or damaged by extensive ranching of cattle and urban or industrial development

Guardian

pre- *prefix* meaning before or in front of

precipitate 1 *noun* substance which is precipitated during a chemical reaction 2 *verb* to make a dissolved substance separate from a solution

◇ **precipitant** *noun* substance added to a solution to make a dissolved substance precipitate

◇ **precipitation** *noun* (a) action of forming solid particles in a solution; **precipitation tank** = sewage tank in which a chemical is added to the sewage before it passes to the sedimentation tanks (b) water which falls from clouds as rain, snow, etc.; *precipitation in the mountain areas is higher than in the plains*

◇ **precipitator** *noun* electrostatic precipitator = device for collecting minute particles of dust suspended in gas, by charging the particles as they pass through an electrostatic field

precise *adjective* very exact or correct; *the instrument can give precise measurements of changes in atmospheric pressure*

precursor *noun* substance or cell from which another substance or cell is developed; *the biggest share of ozone precursors comes from emissions from vehicles*

QUOTE methane is a precursor to reactions that destroy ozone in the stratosphere

New Scientist

predator *noun* animal which kills other animals to eat; *the larvae are predators of aphids; see also PREY*

◇ **predatory** *adjective* referring to a predator; *predatory animals, such as lions and tigers*

◇ **predation** *noun* killing and eating other animals

predominate *verb* to be more powerful than others; *a cold northerly airstream predominates during the winter; dark forms of the moths predominate in industrial areas*

◇ **predominant** *adjective* which is more powerful than others; *the predominant airstream is from the west*

preferendum *noun* area where a species flourishes best

preserve *verb* to keep something in the same state or to stop something from changing or rotting

◇ **preservation** *noun* keeping of something in the same condition; *food preservation allows some types of perishable food to be eaten during the winter months when fresh food is not available; preservation order* = order from a local government department which stops a building from being demolished; *tree preservation order (TPO)* = order from a local government department which prevents a tree from being felled

◇ **preservative** *noun* substance added to food to preserve it by slowing natural decay caused by bacteria, fungi, etc. (in the EC, preservatives are given E numbers E200 - 297)

pressure *noun* (a) (i) action of squeezing or of forcing; (ii) force of something on its surroundings; *atmospheric pressure* = pressure of the air on the surface of the earth; *atmospheric pressure zones* = bands of high and low pressure round the earth (high pressure near the poles, low pressure areas between 40 and 70 degrees latitude north and south, high pressure along the 30 degrees latitude line in the subtropics and then low pressure again round the equator); *osmotic pressure* = pressure required to stop the flow of a solvent through a membrane; *pressure gradient* = change in atmospheric pressure from one place to another on the ground (as shown on a map by isobars); *pressure vessel* =

container that houses the core, the moderator and the coolant in a nuclear reactor (b) force or strong influence to make someone change his mind or change his actions; *pressure group* = group of people with similar interests who try to influence politicians; *the environmental association set up a pressure group to lobby parliament*

◇ **pressurize** *verb* to alter the atmospheric pressure in a container; *pressurized water reactor (PWR)* = type of nuclear reactor in which water is heated to steam under high pressure to turn turbines; *pressurized fluidized-bed combustion (PFBC)* = economic method of burning low-grade coal in a furnace in which air is blown upwards through the burning fuel

prevailing wind *noun* wind which usually blows from a certain direction

prevalent *adjective* common (in comparison to something); *the disease is prevalent in some African countries; a fungus which is more prevalent in deciduous forests*

◇ **prevalence** *noun* frequency of occurrence; *the prevalence of malaria in some tropical countries; the prevalence of cases of malnutrition in large towns*

prevent *verb* to stop something happening; *the pressure group tried to prevent the construction of the new airport*

◇ **prevention** *noun* stopping something happening; *accident prevention* = taking steps to prevent accidents happening

◇ **preventive or preventative** *adjective* which prevents; *preventive medicine* = medical action to prevent a disease from occurring; *preventive measure* = step taken to prevent something from occurring

COMMENT: preventive measures against disease include immunization, vaccination and quarantine

prey 1 *noun* animal which is killed and eaten by another; *small mammals are the prey of owls; bird of prey* = carnivorous bird which kills animals to eat NOTE: no plural 2 *verb* to prey on = to kill and eat (another animal); *water snakes prey on frogs and small fish*

primary *adjective* (something) which is first, and leads to another (secondary); *primary colour* = main colour in the spectrum (red, yellow, blue) from which other colours are formed; *primary commodities* = basic raw materials or food; *primary coolant* = substance used to cool a nuclear reactor, which then passes to a heat exchanger to transfer its heat to another coolant which is used to turn the turbines; *primary energy* = energy required to produce other forms of energy such as heat or electricity; *primary forest* = forest which originally covered a region, before changes in

the environment brought about by people; **primary industry** = industry dealing with raw materials (such as coal, food, farm produce, wood); **primary particulates** = particles of matter sent into the air from fires or from industrial processes or from volcanic eruptions or from sandstorms, etc.; **primary products** = products (such as wood, milk, fish) which are basic raw materials; **primary production** = amount of organic matter which is formed by photosynthesis; **primary sere** = first plant community which grows on a place where no plants have grown before (as on cooled lava from a volcano); **primary succession** = ecological community which starts a succession in a new place; **primary treatment** = first stage of the treatment of sewage by removing most of the floating solid matter; *compare* SECONDARY

QUOTE farmers are convinced that primary industry no longer has the capacity to meet new taxes

Australian Financial Times

QUOTE because it needs such large trees, the woodpecker is confined to primary forest - the evergreen broadleaved forest that once covered all the hills

New Scientist

primates *noun* order of mammals containing monkeys, apes and human beings

COMMENT: primates are the highest order of animals, with brains which are proportionately larger for their size than those of other animals

primordial *adjective* in the very first stage of development

probe 1 *noun* device inserted into a medium to obtain information; **space probe** = device sent into space to obtain information about conditions in space **2** *verb* to investigate the inside of something

process 1 *noun* technical or scientific action; *a new process for extracting oil from shale* **2** *verb* (a) to make a substance undergo a chemical reaction; to produce something by treating a raw material in a factory; **fish processing plant** = factory which takes fish and produces fertilizers, etc. from them (b) to examine or to test samples; *the core samples are being processed by the laboratory*; see also REPROCESSING

produce *verb* to make; *a factory producing agricultural machinery*; *a drug which increases the amount of milk produced by cows*

◇ **producer** *noun* (a) person or company which produces something (b) organism (such as a green plant) which takes energy from outside an ecosystem and channels it into the system (the first level in the food chain)

◇ **product** *noun* (i) thing which is produced; (ii) result or effect of a process; **product of incomplete combustion (PIC)** = compound formed when combustion does not destroy all the waste being incinerated

◇ **production** *noun* (a) act of manufacturing; **production line** = system of manufacturing a product, where the item moves slowly through the factory with new pieces being added to it as it goes along; **production platform** = oil rig in the sea where oil from several wells is collected; **production residues** = waste left after a production process (b) act of producing something by organisms; amount of heat or energy produced by the biomass in an area; **gross production rate** = rate at which a biomass assimilates organic matter; **primary production** = amount of organic matter formed by photosynthesis; **gross primary production** = rate at which a biomass assimilates organic matter; **production ecology** = study of groups of organisms from the point of view of the food which they produce; **production ration** = quantity of fodder needed to make a farm animal produce a product such as milk or eggs (always more than the basic maintenance ration)

◇ **productive** *adjective* which produces a lot; **productive soils** = soils which are very fertile and produce large crops

◇ **productivity** *noun* rate at which something is produced; *with new strains of rice, productivity per hectare can be increased*; **primary productivity** = (i) rate at which plants produce organic matter through photosynthesis; (ii) amount of organic matter produced in a certain area over a certain period of time (such as a crop during a growing season); **net productivity** = difference between the amount of organic matter produced by photosynthesis and the amount of organic matter used by plants in their growth

QUOTE rising global temperatures could completely alter the face of the earth. Many of the world's most fertile regions are likely to become drier and less productive, whilst regions like India and the Middle East are expected to become wetter and more fertile

Ecologist

profession *noun* all the characters (chemical, physical, biological) that determine the position of an organism or species in an ecosystem (such as an aquatic predator, a terrestrial herbivore)

profundal zone *adjective* area of water in a lake below the limnetic zone

programme *noun* planned course of action

project 1 *noun* plan or scheme of work; *the land reclamation project will cost several million dollars*; **pilot project** = project which is tested on a small-scale before starting to

implement a full-scale work 2 *verb* to protrude or to stick out

QUOTE rural health projects enable vaccines and other essential health technologies to reach more of the population. Most rural electrification projects involve the government providing electricity supplies at little or no cost

Appropriate Technology

promontory *noun* area of high land which sticks out into the sea

promote *verb* to encourage a reaction to take place; *growth-promoting hormones are used to increase the weight of beef cattle*

◇ **promoter** *noun* growth promoter = substance which is used to make animals or plants grow

◇ **promotion** *noun* encouraging something to take place; *growth promotion may alter the nutritional quality of wheat*

propagate *verb* to produce new plants

◇ **propagation** *noun* making new plants grow

◇ **propagator** *noun* device in which seed can be sown or cuttings taken to produce a number of new plants

COMMENT: the commonest of the various forms of plant propagation are: growing from seed or from tubers (such as potatoes); growing clones (as by taking cuttings, grafting, budding roses, layering)

propane *noun* gas found in petroleum, which is sold commercially in liquid form under pressure as LPG

propellant *noun* substance used to make something move; gas used in an aerosol can to make the spray come out

QUOTE many companies have announced that they will stop using CFCs as propellants

Environment Now

property *noun* (a) distinctive characteristic of a substance; *we use the energy-producing properties of uranium isotopes in nuclear reactors* (b) something which belongs to someone; *the farmland is the property of a large corporation and they have applied to use it for industrial construction*

prophylaxis *noun* prevention of a disease (as by spraying to kill insects)

◇ **prophylactic** *noun* (substance) which helps to prevent the development of a disease (such as antimalaria tablets)

protease *noun* digestive enzyme that breaks down proteins in food

protect *verb* to keep something safe from harm; *the population must be protected against the spread of the virus*

◇ **protection** *noun* thing which protects; *children are vaccinated as a protection against disease*; *environmental protection* = action of making sure that the environment is not harmed

◇ **protective** *adjective* which protects

protein *noun* nitrogen compound which is present in and is an essential part of all living cells in the body, formed by the condensation of amino acids; **protein balance** = situation when the nitrogen intake in protein is equal to the excretion rate (in the urine); **protein deficiency** = lack of enough proteins in the diet

◇ **proteolysis** *noun* breaking down of proteins in food by proteolytic enzymes

◇ **proteolytic** *adjective* referring to proteolysis; **proteolytic enzyme** or **protease** = digestive enzyme which breaks down proteins in food

COMMENT: proteins are necessary for growth and repair of the body's tissue; they are mainly formed of carbon, nitrogen and oxygen in various combinations as amino acids. Certain foods (such as beans, meat, eggs, fish and milk) are rich in protein

protest 1 *noun* showing disagreement; *they refused to buy from the supermarket in protest against the company's policy of not stocking organic food* 2 *verb* to protest against something = to show you disagree with something; *crowds protested against the killing of seals*

NOTE: in US English, you **protest** something but in British English you **protest against** something

protium *noun* commonest light isotope of hydrogen

proto- *prefix* meaning first or at the beginning

proton *noun* particle with a positive charge found in the nucleus of an atom

protoplasm *noun* substance like a jelly which makes up the largest part of each cell

◇ **protoplasmic** *adjective* referring to protoplasm

◇ **protoplast** *noun* basic cell unit in a plant formed of a nucleus and protoplasm

Protozoa *plural noun* tiny simple organisms like amoebae, with a single cell or no cell at all, but with a nucleus NOTE: the singular is **protozoan**

◇ **protozoan** 1 *adjective* referring to the Protozoa 2 *noun* = PROTOZOON

COMMENT: parasitic Protozoa can cause several diseases, such as amoebiasis, malaria and other tropical diseases

pseud- or **pseudo-** prefix meaning false or similar to something, but not the same

psych- or **psycho-** prefix referring to the mind

◇ **psychological** adjective referring to psychology; caused by a mental state

◇ **psychology** noun study of human behaviour and mental processes

Pt chemical symbol for platinum

Pu chemical symbol for plutonium

puddingstone noun type of conglomerate, stone which is formed from other stones fused together

pulp noun any soft wet tissue, usually inside a harder exterior; **wood pulp** = softwood which has been pulverized into tiny fragments and mixed with water, used to make paper; **pulpwood** = softwood used for making paper

pulse noun (a) (i) any regular recurring variation in quantity; (ii) pressure wave which can be felt in an artery each time the heart beats to pump blood; **to take someone's pulse** = to place fingers on an artery to feel the pulse and count the number of beats per minute (b) sudden increase in something; **acid pulses** = sudden increases in acidity in rainwater or river water (c) **pulses** = seeds of leguminous plants (lentils, beans and peas) used as food; **pulses provide a large amount of protein**

pulverize verb to reduce (something) to small particles like powder

◇ **pulverization** noun stage in the treatment of waste where it is reduced to small particles

pumice (stone) noun light glass-like substance formed from foam at the edge of a lava flow

pump 1 noun machine which forces liquids or air into or out of something; **heat pump** = device which cools or heats by transferring heat from cold areas to warm ones (used in refrigerators or for heating large buildings); **wind pump** = pump driven by wind, which raises water out of the ground **2** verb to force liquid or air along a tube out of something; **pumping station** = works where water or sewage or gas, etc. is pumped along a pipe or out of the ground or up to a storage tank, etc.; **pumped-storage system** = hydroelectric system, where the system generates electricity at times of peak demand and pumps water up to a high reservoir at low-peak periods

COMMENT: a pumped-storage turbine acts as an electricity generator when water pressure is high, and becomes a water pump when water pressure is low, pumping water back up to the reservoir

pupa noun chrysalis, stage in the development of certain insects (such as butterflies) where the larva becomes encased in a hard shell

NOTE: the plural is **pupae**

◇ **pupal** adjective referring to a pupa

◇ **pupate** verb (of insect) to move from the larval to the pupal stage

pure adjective very clean or not mixed with other substances; substance which does not contain any other substances; **pure alcohol** or **alcohol BP** = alcohol with 5% water; **a pure strain of plants** = plants bred by self-fertilization whose characteristics remain always the same; **pure tone** = sound formed of a single frequency containing no harmonics

◇ **purification** noun action of making something pure; **activated sludge speeds up the purification process**

◇ **purify** verb to make pure

◇ **purity** noun state of being pure

putrefaction noun decomposition of dead organic substances by bacteria

◇ **putrefy** verb to rot or to decompose

◇ **putrescible** adjective (waste matter) which can be rotted

PVC = POLYVINYLCHLORIDE

PWR = PRESSURIZED WATER REACTOR

pylon noun tall metal construction for carrying high-tension electric cables; **pylons can be unsightly and can be avoided by putting the cables they carry underground**

pyr- or **pyro-** prefix referring to burning

pyramid noun graphical representation of the structure of an ecosystem (it may be measured in terms of number, biomass or energy); **pyramid of numbers** or **biotic pyramid** or **ecological pyramid** = chart showing the structure of an ecosystem in terms of who eats what (the base is composed of producer organisms (usually plants), then herbivores, then carnivores; **pyramid of biomass** = chart showing the different amounts of biomass at each trophic level, with the highest biomass at producer level and the lowest at secondary consumer level (the biomass at each level is about ten per cent of that of the level beneath); **pyramid of energy** = chart which shows the amounts of energy consumed at each trophic level

pyrethrum *noun* organic pesticide, developed from a form of chrysanthemum, which is not very toxic and non-persistent

pyrolysis *noun* conversion of a substance into another one by heat

pyridoxine *noun* vitamin B₆

COMMENT: pyridoxine is present in meat, cereals and treacle. Lack of pyridoxine causes vomiting and convulsions in babies

Qq

Q unit of energy equal to 10^{18} Btu

quad unit of energy equal to 10^{15} Btu

quadrat *noun* area of land measuring one square metre, chosen as a sample for research into plant populations; *the vegetation of the area was sampled using the quadrat method*

quake = EARTHQUAKE

quality *noun* what something is like or how good or bad something is; *good quality or bad quality*; *high quality or top quality* = very best quality; *we sell only quality farm produce* = we sell only farm produce of the best quality; *quality of life* = good points about the type of life which people live or hope to live; *the aim of the ban on emitting polluting gases is to improve the quality of life in the surrounding regions*

◇ **qualitative** *adjective* referring to quality; *qualitative analysis* = analysis of what elements are present in a chemical compound; *qualitative inheritance* = inheritance of a major characteristic which distinguishes individual specimens of a species

quango *noun* official body, set up by a government to investigate or deal with a special problem

quantify *verb* to quantify the effect of something = to show the effect of something in figures; *it is impossible to quantify the effect of the new legislation on pollution levels*

◇ **quantifiable** *adjective* which can be quantified; *the effect of the change in the waste disposal systems is not quantifiable*

quantity *noun* amount or number of items; *to carry out a quantity survey* = to estimate the amount of materials and the cost of the labour required for a construction project

◇ **quantitative** *adjective* referring to quantity; *quantitative analysis* = analysis of the quantity of a chemical element present in a compound; *quantitative inheritance* = inheritance of a characteristic which can vary slightly from specimen to specimen in a species

quarantine 1 *noun* period (originally forty days) when an animal or person or ship just arrived in a country has to be kept separate in case it carries a serious disease, to allow the

disease time to develop and so be detected; *the animals were put in quarantine on arrival at the port*; *a ship in quarantine shows a yellow flag called the quarantine flag 2* *verb* to put a person or animal in quarantine

COMMENT: animals coming into Britain are quarantined for six months because of the danger of rabies. People who are suspected of having an infectious disease can be kept in quarantine for a period which varies according to the incubation period of the disease. The main diseases concerned are cholera, yellow fever and typhus

quarry 1 *noun* place where rock is mined 2 *verb* to extract rock for commercial purposes

quartile *noun* one of three figures below which 25%, 50% and 75% of a total falls

quartz *noun* mineral form of silica, found often as crystals in igneous rocks (pure quartz is known as rock crystal)

QUOTE quartz is resistant to weathering and lacks the metals needed for cation exchange, and so percolation through quartz does little to buffer acid

Scientific American

quasi- *prefix* almost or which seems like; *a quasi-official body*

quaternary era *noun* geological era which is still currently in existence

quench layer *noun* deposit of unburnt hydrocarbons on the walls of cylinders in an internal combustion engine

quicklime *noun* calcium oxide, chemical used in many industrial processes, and also spread on soil to reduce acidity

quiescent *adjective* (of volcano) inactive; (of seed) not germinating because the conditions are unsatisfactory

quinine *noun* alkaloid drug made from the bark of a South American tree (the cinchona): **quinine poisoning** = illness caused by taking too much quinine

◇ **quininism** or **quinism** *noun* quinine poisoning

COMMENT: quinine was formerly used to treat the fever symptoms of malaria, but is not often used now because of its side-effects. Symptoms of quinine poisoning are dizziness and noises in the head. Small amounts of quinine have a tonic effect and are used in tonic water

quota *noun* fixed amount of something which is allowed; *the government has imposed a*

quota on the fishing of herring; quota system = system where imports or supplies are regulated by fixing maximum amounts

quotient *noun* result when one number is divided by another; **intelligence quotient (IQ)** = ratio of the result of an intelligence test shown as a relationship of the mental age to the actual age of the person tested (the average being 100)

Rr

R *symbol for roentgen*

R-value *noun* unit of measurement of resistance to the flow of heat

COMMENT: an insulated outside wall has an R-value of R-11, an internal ceiling R-19

Ra *chemical symbol for radium*

raceme *noun* inflorescence on which flowers are borne on stalks

rad *noun* former unit of radiation absorbed into the body (Gray is now used to mean one hundred rads); *see also* BECQUEREL

radiant *adjective* which is sent out in the form of rays; **radiant heat** = heat which is transmitted by infrared rays from hot bodies (an electric fire sends out radiant heat from a hot wire coil)

radiate *verb* (a) to spread out in all directions from a central point (b) to send out rays; **heat radiates from the body**; **beta rays are radiated from a radioactive isotope**

◇ **radiation** *noun* (a) spreading out from a central point; **adaptive radiation** = development of a species from a single ancestor in such a way that different forms evolve to fit different environmental conditions (b) waves of energy which are given off when heat is transferred, or by certain radioactive substances; **background radiation** = radiation which comes from rocks or the earth or the atmosphere and not from a single man-made source which can be traced; **thermal radiation** = emission of radiant heat; **radiation burn** = burning of the skin caused by exposure to large amounts of radiation; **radiation enteritis** = enteritis caused by X-rays; **radiation fog** = fog which forms when moist air is warmer than the ground beneath it; **radiation pollution** = contamination of the environment by radiation; **radiation sickness** = illness caused by exposure to radiation from radioactive substances; **radiation treatment** = RADIOTHERAPY; **radiation zone** = area that is contaminated by radiation and which people are not allowed to enter

COMMENT: prolonged exposure to ionizing radiation from various sources can be harmful. Nuclear radiation from fallout from nuclear weapons, atomic radiation from power stations, background radiation from substances naturally present in the soil, exposure to X-rays (either as a patient being treated, or as a radiographer) can cause radiation sickness. First symptoms of the sickness are diarrhoea and vomiting, but radiation can also be followed by skin burns and loss of hair. Massive exposure to radiation can kill quickly, and any person exposed to radiation is more likely to develop certain types of cancer than other members of the population. The main radioactive pollutants are strontium-90, caesium-137, iodine-131 and plutonium-239

radio- *prefix* referring to (i) radiation; (ii) radioactive substances

radioactive *adjective* (substance) whose nucleus disintegrates and gives off energy in the form of radiation which can pass through other substances; **radioactive decay** = gradual disintegration of a nucleus; **radioactive isotope** = natural or artificial isotope that sends out radiation, used in radiotherapy; **radioactive waste** = expended radioactive materials produced by nuclear power stations, by other industrial plants using radioactive materials, by hospitals, etc.

◇ **radioactivity** *noun* giving off energy in the form of radiation

COMMENT: the commonest naturally radioactive substances are radium and uranium. Other substances can be made radioactive for industrial or medical purposes by making their nuclei unstable, so forming radioactive isotopes. Radioactive wastes are classified as low-level (which are not very dangerous), intermediate, and high-level (which emit dangerous levels of radiation and cause disposal problems)

radiobiologist *noun* scientist who specializes in radiobiology

◇ **radiobiology** *noun* scientific study of radiation and its effects on living things

◇ **radiocarbon** *noun* radioactive isotope of carbon, whose presence is used to date ancient

objects; **radiocarbon dating** = determining the age of an object by the amount of radiocarbon that has decayed

◇ **radiodermatitis** *noun* inflammation of the skin after exposure to radiation

◇ **radiogenic heat** *noun* heat generated by the decay of radioactive substances

◇ **radiograph** *noun* X-ray photograph

◇ **radiographer** *noun* person specially trained to operate a machine to take X-ray photographs or radiographs

◇ **radiography** *noun* examining the internal parts of a patient by taking X-ray photographs

radioisotope *noun* isotope of a chemical element which has been made radioactive

COMMENT: radioisotopes are used in medicine to provide radiation for radiation treatment. Radioisotopes of iodine are used to investigate thyroid activity

radiologist *noun* doctor who specializes in radiology

◇ **radiology** *noun* use of radiation to diagnose disorders (as in the use of X-rays or radioactive tracers) or to treat diseases such as cancer

◇ **radioscopy** *noun* examining an X-ray photograph on a fluorescent screen

◇ **radiosensitive** *adjective* (cancer cell) which is sensitive to radiation and can be treated by radiotherapy

◇ **radiosonde** *noun* radio transmitter sent into the atmosphere attached to a balloon to report readings of altitude, pressure, temperature, etc.

◇ **radiotherapy** *noun* treating a disease by exposing the affected part to radioactive rays such as X-rays or gamma rays

COMMENT: many forms of cancer can be treated by directing radiation at the diseased part of the body

radium *noun* natural radioactive metallic element

NOTE: chemical symbol is **Ra**; atomic number is 88

radon *noun* natural radioactive gas, formed from the radioactive decay of radium

NOTE: chemical symbol is **Rn**; atomic number is 86

COMMENT: radon occurs naturally in soil, in construction materials and even in ground water. It can seep into houses and causes radiation sickness

rain *noun* water which falls from clouds as small drops; **rain-bearing clouds** = clouds which carry moisture in droplet form which can fall as rain; **rain shadow** = reduction of rainfall on the lee side of a mountain; **acid rain**

= rain which contains a higher level of acid than normal; see also **ACID**; **artificial rain** = rain which is made by "seeding" clouds with crystals of salt and other substances

◇ **rainbow** *noun* natural phenomenon which occurs when light strikes water droplets, especially when sunlight hits rain or spray from a waterfall, creating a semi-circle of rings of each of the colours of the spectrum

◇ **raindrop** *noun* drop of water which falls from a cloud

◇ **rainfall** *noun* amount of water which falls as rain on a certain area over a certain period

◇ **rainforest** *noun* thick tropical forest which grows in regions where the rainfall is very high; **poor farmers have cleared hectares of rainforest to grow cash crops**

◇ **rainmaking** *noun* attempting to create rain by scattering carbon dioxide on clouds

◇ **rainout** *noun* process where particles in the atmosphere act as centres round which water can form drops which then fall as rain; see also **WASHOUT**

◇ **rains** *noun* season when heavy rain falls

◇ **rainwash** *noun* erosion of soil by rain

◇ **rainwater** *noun* water which falls as rain from clouds

◇ **rainy** *adjective* with a lot of rain; **the rainy season lasts from April to August**

COMMENT: rain is normally slightly acid (about 5.6 pH) but becomes more acid when pollutants from burning fossil fuels are released into the atmosphere

raise *verb* to increase; to make higher; **raised beach** = beach of sand left higher than sea-level because the level of the sea has fallen; **raised bog** = bog where the dead moss has accumulated without decomposing, so raising the level of the bog above the surrounding land

ramet *noun* single cloned organism

ranch *noun* cattle ranch = very large grassland farm where cattle are raised; **governments have encouraged the conversion of rainforest to livestock ranches**

◇ **ranching** *noun* raising cattle on ranches

QUOTE plantations and ranching have laid waste millions of hectares of forest. In Central America cattle ranching is responsible for the clearance of almost two-thirds of the forests
Ecologist

range *noun* (a) series of different but similar things; **mountain range** = series of mountains running in a line for many miles (b) (i) difference between lowest and highest values in a series of data; (ii) area within two or more points; **the temperature range is over 50°C**; **the geographical range of the plant is from the Arctic Circle to Southern Europe** (c) large area

of grass-covered farmland used for raising cattle or sheep

rape *noun* oil-seed **rape** = plant of the cabbage family extensively grown to provide oil, also used as green manure

rapid 1 *adjective* (action) which is repeated many times during a short space of time; *the rapid growth of grasses after the rains came; the rapid beating of the wings of a hummingbird* 2 *noun* **rapids** = part of a river where the water flows rapidly over large rocks

raptor *noun* bird of prey

◇ **raptorial** *adjective* referring to raptors

rare *adjective* not common or (disease) of which there are very few cases; **rare earth elements** = metallic elements (numbers 57 to 71 on the periodic table); **rare gases** = inert gases (helium, neon, argon, krypton, xenon and radon) that do not react chemically with other substances

◇ **rarity** *noun* state of being rare

COMMENT: species are classified internationally into several degrees of rarity: rare, means that a species is not numerous and is confined to small local populations, but is not necessarily likely to become extinct. Vulnerable means that a species has a small population and that population is declining. Endangered means that the species has such a small population that it is likely to become extinct

rate *noun* (a) amount or proportion of something compared to something else; **birth rate** = number of children born per 1,000 of population; **death rate** = number of deaths per 1,000 of population; **fertility rate** = number of births per year calculated per 1,000 females aged between 15 and 44; **rate of natural increase** = difference between the crude birth rate and the death rate; **rate of population growth** = increase in population in a certain area divided by the initial population (b) number of times something happens; **heart rate** = number of times the heart beats per minute

COMMENT: worldwide, the current human birth rate is 34 per 1,000, and the death rate is 15 per 1,000, showing that the world's population is increasing. There are, however, substantial differences between rates in different countries

rating *noun* value of something; **antiknock rating** = classification of petrol, showing how likely it is to cause knocking; **octane rating** = classification of the quality and performance

of petrol, according to the amount of hydrocarbon in it

ratio *noun* number which shows a proportion or which is the result of one number divided by another; *an IQ is the ratio of the person's mental age to his chronological age*

ration *noun* amount of food given to an animal; **maintenance ration** = amount of food needed to keep a farm animal healthy but not productive; **production ration** = amount of food needed to make a farm animal produce meat, milk, eggs, etc.

raw *adjective* (a) (food) which has not been cooked (b) **raw sewage** = sewage which has not been treated

ray *noun* line of light or radiation or heat; **infrared rays** = long invisible rays, below the visible red end of the spectrum which form the warming radiation which the earth receives from the sun; **ultraviolet rays (UV rays)** = short invisible rays beyond the violet end of the spectrum, which form the element in sunlight which tans the skin; *see also X-RAY*

RDF = REFUSE-DERIVED FUEL

react *verb* (a) to react to something = to act because of something else or to act in response to something; *the government reacted slowly to the news of the disaster* (b) (of a chemical substance) to react with something = to change because of the presence of another substance; *ozone is produced as a result of oxides reacting with sunlight*

◇ **reaction** *noun* (i) action which takes place because of something which has happened earlier; (ii) effect produced by a stimulus; (iii) chemical change when two substances come into contact and cause each other to change; **chain reaction** = (i) nuclear reaction where a neutron hits a nucleus, makes it split, and so releases further neutrons; (ii) chemical reaction where each stage is started by a chemical substance which reacts with another, producing further substances which can continue to react; **nuclear reaction** = physical reaction of the nucleus of an atom, which when bombarded by radiation particles creates an isotope

◇ **reactivity** *noun* ability of something to react

QUOTE if ozone gets into the lower atmosphere, its greater reactivity over oxygen makes it highly toxic to plants

New Scientist

reactor *noun* **nuclear reactor** = device which creates heat and energy by starting and controlling atomic fission

COMMENT: nuclear reactors are used (a) to produce energy in power stations or motors; (b) to produce plutonium-239 for use in weapons; (c) for research purposes. A nuclear reactor needs fuel, and the most common fuel used is uranium dioxide, which contains both fissionable uranium-235 and fertile uranium-238 isotopes. The fuel in a reactor is in the form of hundreds of rods, each separated from the others by cladding. The fission of the fuel produces fast neutrons which have to be slowed down by a moderator such as water (H_2O), heavy water (D_2O) or graphite. All nuclear power stations produce electricity from steam-driven generators: the heat required to produce the steam is produced by nuclear fission and transferred the water in several ways. In boiling water reactors (BWRs), light water is heated to boiling point and the steam produced drives a turbine. In pressurized water reactors (PWRs), the water is heated under pressure to a very high temperature, and this pressurized hot water is passed through a water tank heating the water in the tank until it becomes steam to drive the turbines. In the advanced gas-cooled reactors (AGRs), carbon dioxide or helium is heated to a very high temperature and then passed through water to create steam. Pollution from nuclear reactors is possible due to the escape of radiation into the surrounding environment. This may take the form of discharge of the coolant, radiation from the disposal of spent fuel, or by accidental overheating which ruptures pipes

reading *noun* note taken of figures, especially of degrees on a scale; *readings were taken over an area of 60 square miles round the nuclear power station; temperature readings over the last decade show a gradual rise in surface temperature*

reafforestation *noun* planting trees again in an area which was once covered by forest

QUOTE the first priority in any programme of ecological recovery must be a worldwide programme of reafforestation. Even the most degraded lands in the dry tropics can be restored to forest, successful reafforestation schemes having been implemented in Costa Rica and India

Ecologist

reagent *noun* chemical substance which reacts with another substance (especially when used to detect the presence of the second substance)

rear *verb* to look after young animals until they are old enough to look after themselves

receptor cell *noun* nerve ending which senses a change in the surrounding environment or in the body (such as cold or pressure or pain) and reacts to it by sending an impulse to the central nervous system; *see also* CHEMORECEPTOR, EXTEROCEPTOR, INTEROCEPTOR

recessive *adjective* (trait) which is weaker than and hidden by a dominant gene

COMMENT: since each physical characteristic is governed by two genes, if one gene is dominant and the other recessive, the resulting trait will be that of the dominant gene. Traits governed by recessive genes will appear if genes from both parents are recessive

reclaim *verb* to take virgin land or land which has already been developed and make it available for agricultural or commercial purposes

◇ **reclamation** *noun* (a) (i) act of reclaiming land; (ii) land which has been reclaimed; *the authority is studying the costs of the land reclamation scheme in the city centre* (b) recovering something which might be lost; *heat reclamation* = recovering heat by burning refuse

recommend *verb* to suggest that it would be a good thing if someone did something; *the report recommended choosing a different site for the disposal of radioactive waste*

◇ **recommendation** *noun* advising that something should be done; *the council accepted the co-mittee's recommendations about disposal of waste*

reconstitute *verb* to put something back into its original state; *the government has insisted that the mining company should reconstitute the site after the open-cast mining operation has closed down*

record 1 *verb* to note information; *the chart records the variations in the rainfall pattern 2 noun* piece of information about something; *the winter was the wettest since records were started in 1896*

recover *verb* (a) to get better; to get back to a previous state; *the fish populations may never recover from overfishing* (b) to obtain (metals or other useful materials) from waste by separating and purifying it

◇ **recovery** *noun* (a) getting back to a previous state; *the area has been overfished to such an extent that the recovery of the fish population is impossible; heat recovery* = collecting heat from substances heated during a process and using it to heat further substances, so as to avoid heat loss (b) extracting metals and other useful materials from waste

recycle *verb* to take waste material and process it so that it can be used again; *the glass industry recycles tonnes of waste glass each year; switching to using recycled paper can be cost-effective; recycled paper* = paper made from old waste paper

COMMENT: many waste items can be recycled. In particular, precious metals (lead, copper, silver, etc.) can be recovered from old batteries or computers; paper can be recycled from old newspapers and packaging materials (after deinking); glass can be manufactured from cullet from old bottles

red *adjective & noun* (of) a colour like the colour of blood; **red algae** = tiny phytoplankton which are red and cause red tide; **Red Data Book** = catalogue published by the IUCN, listing species which are rare or in danger of becoming extinct; **red sea** or **red tide** = phenomenon where the sea becomes red, a bloom caused by millions of microscopic organisms; **red snow** = snow coloured red by the presence of algae

◇ **redness** *noun* being red or red colour

◇ **redwood** *noun* American conifer, often growing to a very large size

redevelop *verb* to take an area with buildings, demolish the buildings and build new ones; *the company has put forward a plan to redevelop the area around the railway station*

◇ **redevelopment** *noun* act of redeveloping an area; *the council's planning committee has approved the redevelopment plan for the town centre*

reduce *verb* to make something smaller or lower

◇ **reducer** *noun* decomposer or organism which breaks down organic substances to simple chemicals

◇ **reduction** *noun* making less or becoming less; *the key to controlling acid rain must be the reduction of emissions from fossil-fuelled power stations*

redundant *adjective* no longer useful; **redundant farmland** = land which is currently being used for farming but which will not be in the future

reeds *noun* aquatic plants growing near the shores of lakes, used to make thatched roofs

◇ **reedbed** *noun* mass of reeds growing together

reef *noun* low rocks or coral near the surface of the sea; **barrier reef** = long coral reef, lying parallel to the shore, and enclosing a lagoon

refine *verb* to make something pure; *a by-product of refining oil*

◇ **refinery** *noun* plant where raw metal or crude oil is processed to produce pure substances

reflect *verb* to send back light or heat or sound towards its source or in a different direction; *some solar radiation is reflected back by clouds or by the earth's surface*

◇ **reflection** *noun* light or sound or heat which is sent back towards its source; *bats find their way by sending out high frequency sounds and listening to the reflection of the sound from objects in their way*

reflex *noun* automatic reaction to a stimulus; **accommodation reflex** = reaction of the pupil when the eye focuses on an object which is close; **light reflex** = reaction of the pupil of the eye which changes size according to the amount of light going into the eye; **reflex action** = automatic reaction on the part of an animal to a stimulus (such as a sneeze after breathing in dust)

reflux *noun* (of a liquid) flowing backwards in the opposite direction to normal flow; (in distillation) collecting vapour and condensing it so that it can return to the boiler again

refract *verb* to make light rays change direction as they go from one medium (such as air) to another (such as water)

◇ **refraction** *noun* (i) change of direction of light rays as they enter a different medium; (ii) measurement of the angle at which the light rays bend

refrigerate *verb* to make something cold

◇ **refrigerant** *noun* substance (such as liquid ammonia) which makes other substances cold

◇ **refrigeration** *noun* making something cold

◇ **refrigerator** *noun* machine which keeps things cold

refuge or **refugium** *noun* safe place where species can escape environmental change and continue to exist as before NOTE: plural of **refugium** is **refugia**

refuse *noun* rubbish or waste matter; **household refuse** = waste materials from domestic houses; **refuse collection and disposal** = gathering waste from houses and getting rid of it; **refuse-derived fuel (RDF)** = fuel which is made or processed from refuse

regenerate *verb* to replace by new growth; *a forest takes about ten years to regenerate after a fire*

◇ **regenerative** *adjective* which allows new growth to replace damaged tissue; **regenerative properties** = ability of something, such as an ecosystem, to recover from pollution

◇ **regeneration** *noun* growing again (of vegetation on land which has been cleared);

grazing by herbivores prevents the regeneration of forests destroyed by fire

regime *noun* general pattern of work; *the two rivers have very different flow regimes: one has very rapid flow down from high mountains, the other is slower and mainly crosses fertile plains*

register *verb* to note a piece of data; *several lakes have registered a steady increase in acidity levels until their natural fish populations have started to decline; the earthquake registered 6.2 on the Richter scale*

regress *verb* to return to an earlier stage or condition

◇ **regression** *noun* returning to a more primitive earlier state, as when cultivated land returns to a wild state

regulate *verb* (i) to make something work (in a regular way); (ii) to change or maintain something by law; *planning permission is regulated by local authorities*

◇ **regulations** *noun* rules laid down by clubs or societies, that their members have to obey; rules made by governments; *the safety regulations have not been complied with; the pamphlet lists the regulations concerning visits to nature reserves*

◇ **regulatory** *adjective* which makes something work according to regulations or laws; Nuclear Regulatory Commission (NRC) = US government body which regulates and licenses nuclear plants

reheat *verb* to heat something again; *water which has been cooled and condensed after passing through the boilers is sent back to the boilers for reheating*

◇ **reheater** *noun* section of a power station where steam which has been used to turn the first turbine is heated again to create enough pressure to turn the second turbine

relate *verb* to connect to

◇ **-related** *suffix* connected to

◇ **relationship** *noun* way in which someone or something is connected to another

◇ **relative** *adjective* which is compared to something else; **relative abundance** = number of individual specimens of an animal or plant seen over a certain period of time in a certain place; **relative humidity** = ratio between the amount of water vapour in air and the amount which would be present if the air was saturated (shown as a percentage); **relative transpiration** = rate at which water transpires from the surface of a plant

release 1 *noun* act of freeing or allowing something to go out; *the report points out the danger of radiation releases from nuclear power stations* 2 *verb* to let something out or to let something go free; *acid rain leaches out*

nutrients from the soil and releases harmful substances such as lead into the soil; using an aerosol spray releases CFCs into the atmosphere

◇ **releaser** *noun* stimulus which provokes a reaction in an animal (such as the sight of a hawk or the sound of a gun)

releve *noun* list of plant species growing in a certain area

relict *noun* species which is still in existence, even though the environment in which it originally developed is no longer present

rem - ROENTGEN EQUIVALENT MAN unit of measurement of ionizing radiation, equivalent to the effect of absorbing one roentgen (now replaced by the sievert)

renew *verb* to make something new again

◇ **renewable** *adjective* (energy) from the sun, wind, waves, tides, and geothermal energy or energy from burning waste, none of which use up fossil fuel reserves

QUOTE today's primary sources of energy are mainly non-renewable: natural gas, coal, peat and conventional nuclear power. There are also renewable sources, including wood, plants, dung, falling water, geothermal sources and solar, tidal, wind and wave energy. Nuclear reactors that produce their own fuel (breeders) and eventually fusion reactors, are also in this category

Brundtland report

repel *verb* to drive away

◇ **repellent** *noun* substance which repels; *the coating of wax on leaves acts as a repellent to pollutants; insect repellent* = chemical which protects by repelling insects which might sting

◇ **repellent** *adjective* which repels

replant *verb* to plant again; *after the trees were felled, the land was cleared and replanted with mixed conifers and broadleaved species*

replication *noun* process in the division of a cell, where the DNA makes copies of itself

report 1 *noun* official note stating what action has been taken or what the current state is or what results have come from a test, etc. 2 *verb* to give an account of something; **reportable diseases** = diseases (such as asbestosis or hepatitis or anthrax) which may be caused by working conditions or may infect other workers and must be reported to the Local Health Authority

repository *noun* US place where nuclear waste can be stored

repower *verb* to rebuild an old power station, converting it to a more modern combustion

system, such as pressurized fluidized-bed combustion

reprocess *verb* to process again

◇ **reprocessing** *noun* processing something again, such as taking spent nuclear fuel and subjecting it to chemical processes which produce further useful materials (such as plutonium)

COMMENT: reprocessing plants are the cause of much controversy; some countries do not have facilities for reprocessing spent nuclear fuel, and therefore export it to those countries with suitable plants. Unfortunately, reprocessing plants are just as likely to cause radioactive waste as nuclear power stations; the transport of the spent material from the power station to the processing plant is also a potential radiation hazard

reproduce *verb* (a) to produce offspring; (of bacteria, etc.) to produce new cells (b) to do a test again in exactly the same way

◇ **reproduction** *noun* process of making offspring or derived cells, etc.; **organs of reproduction** = REPRODUCTIVE ORGANS; **asexual reproduction** = reproduction by taking cuttings of plants or by cloning

◇ **reproductive** *adjective* referring to reproduction; **reproductive organs** = parts of the bodies of animals which are involved in the conception and development of a fetus; **reproductive system** = arrangement of organs and ducts in the bodies of animals which produces spermatozoa and ova; **reproductive tract** = series of tubes and ducts which carry spermatozoa and ova from one part of the body to another

COMMENT: in the male, the testes form the spermatozoa, which pass out of the body through the urethra and penis on ejaculation; in the female, ova are produced by the ovaries, and pass through the Fallopian tubes where they are fertilized by spermatozoa from the male. The fertilized ovum moves down into the uterus where it develops into an embryo

reptiles *noun* member of the Reptilia, the class of cold-blooded animals (such as crocodiles, tortoises, snakes) which lay eggs and have scaly skins

research 1 *noun* scientific study which investigates something new; *a research borehole found water at a depth of 2,000 feet* 2 *verb* to carry out scientific study; *he is researching the causes of the ozone hole*

reserve *noun* area of unspoiled land where no commercial exploitation is allowed; **game reserve** = area of land kept for raising wild

animals for shooting; **nature reserve** = special area where the wildlife is protected

◇ **reservation** *noun* (a) keeping an area of land reserved for a special purpose (b) (in North America) area of land set aside for native Indian tribes to live in

reservoir *noun* (a) area of water made by man, used for storing water for domestic or industrial use; *the town's water supply comes from reservoirs in the mountains; after two months of drought, the reservoirs were beginning to run dry* (b) natural hole in rock which contains liquid (such as oil) or gas

resident *noun & adjective* (animal) which lives in a place; *the introduced species wiped out the resident population of flightless birds*

residual 1 *adjective* remaining or which is left behind; **residual oil** = oil which is left after crude oil has been through various refining processes; **residual spraying** = spraying insecticide onto walls so that it will stay there and kill insects which come into contact with it 2 *noun* waste left after material has been used

◇ **residue** *noun* material left after a process has taken place; **consumption residues** = waste matter left after manufactured goods are used; **pesticide residues** = amounts of pesticide that remain in the environment after spraying

resilience *noun* strength to stand up to shocks, especially the ability of an ecosystem to return to its normal state after being disturbed

resin *noun* sticky oil which comes from some types of conifer

◇ **resinous** *adjective* referring to resin

resist *verb* to be strong enough to avoid being killed or attacked by a disease or by a pesticide

◇ **resistance** *noun* (a) (i) ability of an organism not to get a disease; (ii) ability of a germ not to be affected by antibiotics; (iii) ability of a pest or weed not to be affected by a pesticide or herbicide; *the bacteria have developed a resistance to certain antibiotics; after living in the tropics his resistance to colds was low; increasing insect resistance to chemical pesticides is a major problem* (b) **environmental resistance** = all the pressures like predation, competition, weather, food availability, which inhibit the potential growth of a population

◇ **resistant** *adjective* able not to be affected by something; *the bacteria are resistant to some antibiotics; fungus-resistant genetic material was found in genetic stocks from Mexico; resistant strain* = strain of an insect which is not affected by pesticides or of bacterium which is not affected by antibiotics

◇ **-resistant** *suffix* meaning which can resist; **DDT-resistant strain of insects**

COMMENT: resistant strains develop quite rapidly after application of the treatment. Some strains of insect have developed which are resistant to DDT. The resistance develops as non-resistant strains dies off, leaving only individuals which possess a slightly different and resistant chemical makeup

resorption *noun* absorbing again of a substance already produced back into an organism; melting of solid rock which falls into magma

resource *noun* anything in the environment which can be used by an organism; *muddy estuaries are among the most productive and important wildlife resources*; **finite resources** = resources which will in the end be used up (such as reserves of coal or gas); **natural resources** = part of the environment that can be used commercially (such as coal deposits); **resource management** = system of controlling the use of resources in such a way as to avoid waste and to use them to the best effect

respiration *noun* action of breathing; **external respiration** = part of respiration concerned with oxygen in the air being exchanged in the lungs for carbon dioxide from the blood; **internal respiration** = part of respiration concerned with the passage of oxygen from the blood to the tissues, and the passage of carbon dioxide from the tissues to the blood

◇ **respiratory** *adjective* referring to breathing; **respiratory pigment** = blood pigment which can carry oxygen collected in the lungs and release it in tissues; **respiratory quotient (RQ)** = ratio of the amount of carbon dioxide taken into the alveoli of the lungs from the blood to the amount of oxygen which the alveoli take from the air; **respiratory system** = series of organs and passages which take air into the lungs, and exchange oxygen for carbon dioxide

COMMENT: respiration includes two stages: breathing in (inhalation) and breathing out (exhalation). Air is taken into the respiratory system through the nose or mouth, and goes down into the lungs through the pharynx, larynx, and windpipe. In the lungs, the bronchi take the air to the alveoli (air sacs) where oxygen in the air is passed to the bloodstream in exchange for waste carbon dioxide which is then breathed out

responsible *adjective* being answerable for something; causing something; *the action of sunlight on gases is responsible for the formation of ozone; they accused the power station of being responsible for deaths from cancer in the area*

◇ **responsibility** *noun* being answerable for something; looking after something; *the general feeling is that large-scale industrial companies are only governed by commercial requirements and have no social responsibility*

rest *verb* to rest land = to let land lie fallow, without growing any crops

restore *verb* to give back; *by letting the land lie fallow for a couple of years, farmers hope to restore some of the natural nutrients which have been removed from the soil*

result **1** *noun* figures at the end of a calculation or at the end of a test; *what was the result of the test?* **2** *verb* to happen because of something; *the cancer resulted from exposure to radiation at work; ozone results from the reaction of chemicals in the atmosphere to sunlight*

retinol *noun* vitamin A, vitamin which is soluble in fat and can be formed in the body, but which is mainly found in food such as liver, vegetables, eggs and cod liver oil

reverse **1** *adjective* going backwards; **reverse osmosis** = method of water purification, where water is forced through a membrane which removes impurities **2** *verb* to change a decision or to do the opposite of what was done before; *the decision of the planning committee was reversed, and the planning application went ahead*

rhizome *noun* plant stem which lies under the ground, and contains leaf buds (as opposed to a root which lies under the ground but is not a stem)

rhizosphere *noun* soil surrounding the roots of a plant

Rhodophyta *noun* red algae, mainly found on the seabed

ria *noun* valley which has been filled by the sea

riboflavine or **vitamin B₂** *noun* vitamin found in eggs, liver, green vegetables, milk and yeast, and also used as an additive (E101) in processed food. Lack of riboflavin will affect a child's growth, and can cause anaemia and inflammation of the mouth and tongue

ribonuclease *noun* enzyme which breaks down RNA

ribonucleic acid (RNA) *noun* one of the nucleic acids in the nucleus of all living cells, which takes coded information from DNA and translates it into specific enzymes and proteins; *see also* DNA

ribosomal *adjective* referring to ribosomes

◇ **ribosome** *noun* tiny particle in a cell, containing RNA and protein, where protein is synthesized

rice *noun* common food plant grown in paddy fields, of which the whitish grains are eaten

rich *adjective* (a) **rich in** = having a lot of something; *green vegetables are rich in minerals; the doctor has prescribed a diet which is rich in protein; the forests are rich in mosses and other forms of moisture-loving plants* (b) (food) which has high calorific value

◇ **-rich** *suffix* meaning having a lot of; *a nutrient-rich detergent; a protein-rich diet; many wild plants have oil-rich seeds which can help in the manufacture of detergents*

◇ **richness** *noun* number of species found in a certain area

QUOTE the seas in the region are rich in krill, plankton and fish

New Scientist

Richter scale *noun* scale of measurement of the force of an earthquake; *there were no reports of injuries after the quake which hit 5.2 on the Richter scale*

QUOTE on 9 February 1971 there was an earthquake registering 6.4 points on the Richter scale. Its epicentre was situated 14 kms from the dam

Ecologist

COMMENT: the scale, devised by Charles Richter, has values from zero to ten, with the strongest earthquake ever recorded being 8.9. Earthquakes of 5 or more on the Richter scale cause damage. The Richter scale measures the force of an earthquake; the damage caused is measured on the Modified Mercalli scale

ridge *noun* (a) long raised section of ground (ridges occur as part of mountains but are also found on the floor of the ocean) (b) long narrow band of high pressure leading away from the centre of an anticyclone; *a ridge of high pressure is lying across the country*

rift valley *noun* long valley with steep walls, formed when land between two fault lines sinks or possibly when a fault widens as plates forming the earth's crust move apart

rig *noun* oil rig = large metal construction with drilling machinery for boring oil wells

riil *noun* little stream

rime *noun* feathery ice formed when freezing fog settles on surfaces

ring 1 *noun* metal circle which goes round something; **ring road** = road which goes right round a town, usually quite close to built-up areas, allowing traffic to bypass the town and not go through the centre **2** *verb* to attach a numbered ring to the leg of a bird so that it can be recorded

COMMENT: ringing is a very common method of tracing bird movements and providing information about bird's ages. It can also cause stress to the birds

rip current or **rip tide** *noun* current which flows against the flow of the incoming waves

riparian *noun* referring to the bank of a river; **riparian fauna** = animals which live on the banks of rivers

ripple *noun* little wave on the surface of the water; *ripple marks can be seen in some sedimentary rocks where the sand was marked by water; see also NERITIC FACIES*

river *noun* large flow of water, running from mountains or hills down to the sea; **river system** = series of small streams and rivers which connect with each other; **river terrace** = flat plain left when a river cuts more deeply into the bottom of a valley

◇ **riverine** *adjective* referring to a river; *the dam has destroyed the riverine fauna and flora for hundreds of kilometres*

Rn *chemical symbol* for radon

RNA = RIBONUCLEIC ACID; **messenger RNA** = type of RNA which transmits information from DNA to form enzymes and proteins

rock *noun* solid mineral substance which forms the outside crust of the earth; **igneous rock** = rock formed from molten lava which has risen to the surface from the earth's core; **metamorphic rock** = rock, such as marble, which has changed because of external influences (such as pressure from other rocks, temperature changes, etc.); **sedimentary rock** = rock which has been formed from silt, broken down from older rocks, deposited as sediment at the bottom of lakes or the sea, and then subjected to pressure; **rock crystal** = pure quartz

rod *noun* one of the two types of light-sensitive cell in the retina of the eye (the rods are sensitive to poor light); *see also CONE*

rodent *noun* order of mammals including rats and mice, which have sharp incisor teeth for gnawing

roentgen or **röntgen** *noun* unit which measures the amount of exposure to X-rays or

gamma rays; **roentgen equivalent man (rem)** = unit of measurement of ionizing radiation equivalent to the effect of absorbing one roentgen (now replaced by the sievert); **roentgen rays** = X-rays or gamma rays which can pass through tissue and leave an image on a photographic film

◇ **roentgenology or radiology** *noun* study of X-rays and their use in medicine

role *noun* all the characters (chemical, physical, biological) that determine the position of an organism or species in an ecosystem (an aquatic predator, a terrestrial herbivore)

root 1 *noun* part of a plant which is normally under the ground and absorbs water and nutrients from the surrounding soil; **root cutting** = cutting taken from a rhizome which can be planted and used to propagate a plant; **root system** = all the roots of a plant **2 verb** to produce roots; **the cuttings root easily in moist sand**; **rooting compound** = powder containing plant hormones (auxins) into which cuttings can be dipped to encourage them to root

◇ **rootstock** *noun* (a) rhizome, plant stem which lies under the ground and contains buds, as opposed to a simple root which is not a stem (b) stock on which a scion is grafted; **dwarfing rootstock** = stock which is normally low-growing so making the grafted tree grow smaller than normal

rot *verb* (of organic tissue) to decay or to become putrefied (because of bacterial action)

rotate *verb* to move in a circle

◇ **rotation** *noun* moving in a circle; **rotation of crops or crop rotation** = system of cultivation, where different crops are planted in three consecutive growing seasons to prevent the nutrients in the soil being totally used up (each plant uses different nutrients), and the land is then allowed to lie fallow for a fourth year

COMMENT: the advantages of rotating crops are firstly that pests particular to one crop are discouraged from spreading, and secondly that some crops actually benefit the soil. Legume (peas and beans) increase the nitrogen content of the soil if their roots are left in the soil after harvesting

rotor *noun* (a) central shaft of a generator, which turns inside the stator (b) rapidly turning mass of air, surrounded by clouds

rough *adjective* not smooth; **rough fish** = fish which are not used for sport or food

◇ **roughage or dietary fibre** *noun* fibrous matter in food, which cannot be digested

COMMENT: roughage is found in cereals, nuts, fruit and some green vegetables. It is believed to be necessary to help digestion and avoid developing constipation, obesity and appendicitis

roundworm *noun* type of worm with a round body, some of which are parasites of animals, others of roots of plants

Royal Society for the Protection of Birds (RSPB) *noun* British society whose aim is the conservation of birds and their habitats

RQ = RESPIRATORY QUOTIENT

rubber *noun* material which can be stretched and compressed, made from a thick white liquid (latex) from a tropical tree

ruderal *adjective* (plant) which grows in rubbish or on waste land

ruminant *noun* animal (such as cow or sheep) which chews cud

COMMENT: ruminants have stomachs with four sections. They take in foodstuffs into the upper chamber where it is acted upon by bacteria. The food is then regurgitated into their mouths where they chew it again before passing it to the last two sections where normal digestion takes place

runoff *noun* (a) removing of water (as from a river in flood) by opening sluices (b) running of rainwater or melted snow from the surface of land into streams (c) flowing of excess fertilizer or pesticide from farmland into rivers; **nitrate runoff causes pollution of lakes and rivers**; **fish are extremely susceptible to runoff of organophosphates**; **fertilizer runoff, such as runoff of phosphates, can cause problems of eutrophication**

rural *adjective* referring to the country, as opposed to the town; **many rural areas have been cut off by floods**; **the government is planning an electrification project for rural areas**

rust 1 *noun* (a) reddish powder (iron oxide) which forms on the surface of iron and iron compounds on contact with damp air (b) type of fungus disease which gives plants a powdery surface **2 verb** to become covered with reddish powder through contact with damp air

rye *noun* hardy cereal crop grown in temperate areas

Ss

S *chemical symbol for sulphur*

saccharin *noun* substance used as a substitute for sugar

safe *adjective* not likely to hurt or cause damage; *technicians are trying to make the damaged reactor safe; it is not safe to drink the water here; safe dose* = amount of radiation which can be absorbed without causing harm to someone

◇ **safely** *adverb* without danger or without being hurt; *low-level waste can be safely disposed of by burying*

◇ **safety** *noun* being safe or without danger; to take safety precautions = to do certain things which make your actions or condition safe; **safety belt** = belt which is worn in a car or a plane to help to prevent a passenger being hurt if there is an accident; **safety zone** = area in which people are not at risk from radiation

Sahara *noun* large desert region running across North Africa

◇ **Saharan** *adjective* referring to the Sahara; **sub-saharan** = south of the Sahara; *rural woodfuel supplies are falling in many countries of sub-saharan Africa*

Sahel *noun* semi-desert region south of the Sahara in the process of being desertified

◇ **Sahelian** *adjective* referring to the Sahel; *a drought in the Sahelian regions*

saline *adjective* referring to salt; *salt marshes have saline soil; saline lake* = salt water lake which is not connected with sea and has a high level of salinity because of evaporation and lack of incoming fresh water; **saline solution** = salt solution, made of distilled water and sodium chloride (such as that used in medicine which is introduced into the body intravenously through a drip)

◇ **salinity** *noun* proportion of salt (sodium chloride) present in a given amount of water or soil; *rising salinity has now become a severe health hazard*

◇ **salination** or **salinization** *noun* process by which soil or water becomes more salty, found especially in hot countries where irrigation is practised

◇ **salinized** *adjective* (land) where evaporation leaves salts as a crust on the dry surface

◇ **salinometer** *noun* instrument for measuring the strength of a saline solution or the density of sea water

salmon *noun* large fish that spawns in freshwater and swims down to the ocean to develop into an adult

◇ **salmonid** *noun* family of fish, including trout, which are very susceptible to pollution in water, and whose presence in water indicates that it is pure

Salmonella *noun* genus of bacteria in the intestines, which are acquired by eating contaminated food, and which cause typhoid fever and food poisoning

salt 1 *noun* (a) common salt = sodium chloride (NaCl), white crystals used to make food, especially meat, fish and vegetables, taste better; **salt dome** = area where salt from beneath the surface of the soil has risen to form a small hill; **salt lake** = lake (not connected with the sea) which has a high level of salinity because of evaporation or because of lack of incoming fresh water; **salt lick** = block of salt given to cattle to lick in hot weather; **salt marsh** = marsh near the sea, formed with sea water; **salt pan** = area where salt from beneath the soil surface rises to form crystals on the surface (b) chemical compound formed from an acid and a metal 2 *adjective* tasting of salt; *sea water is salty; sweat tastes salt*
◇ **salty** *adjective* full of salt; tasting of salt; *excess minerals in fertilizers combined with naturally saline ground to make the land so salty that it can no longer produce crops*

COMMENT: salt forms a necessary part of diet, as it replaces salt lost in sweating and helps to control the water balance in the body. It also improves the working of the muscles and nerves. Salt is used on roads to clear ice and snow, and has a corrosive effect on metal, ruining car bodies

sample 1 *noun* small quantity of something used for testing; *soil samples were taken to test for alkalinity* 2 *verb* to take a small group of something to test; *ecologists used sampling to determine the age of the vegetation in the ecosystem*

sand *noun* fine grains of weathered rock, usually round grains of quartz, found

especially on beaches and in the desert; **oil sands or tar sands** = geological formation (found especially in Canada and the USSR) of sand mixed with bitumen, which can be extracted from the sand and processed to give oil

◇ **sand dunes** *noun* areas of sand blown by the wind into small hills or ridges, often crescent-shaped in the desert or sometimes covered with sparse grass when near the sea

◇ **sandflea or jigger** *noun* tropical insect which enters the skin between the toes and digs under the skin, causing intense irritation

◇ **sandfly fever** *noun* virus infection like influenza, which is transmitted by the bite of the sandfly *Phlebotomus papatasi* and is common in the Middle East

◇ **sandstone** *noun* type of sedimentary rock, formed of round particles of quartz

◇ **sandstorm** *noun* high wind in the desert, which carries large amounts of sand with it

sanitary *adjective* (i) clean; (ii) referring to hygiene or to health; **sanitary landfill or landfilling** = method of disposing of solid refuse by putting it into large holes in the ground and covering it with soil

◇ **sanitation** *noun* being hygienic, especially referring to public hygiene; **poor sanitation in crowded conditions can result in the spread of disease**; **sanitation control** = measures taken to protect public hygiene, such as spraying oil onto the surface of water to prevent insects such as mosquitoes from breeding

sap *noun* liquid carrying nutrients which flows inside a plant

◇ **sappy** *adjective* (wood) which is full of sap

◇ **sapling** *noun* young tree

◇ **sapwood** *noun* outer layer of wood on the trunk of a tree, which is younger than the heartwood inside and carries the sap; *see also* HEARTWOOD

sapele *noun* fine African hardwood, formerly widely exploited but now becoming rarer

sapro- *prefix* meaning decay or rotting

◇ **saprobe** *noun* bacterium that lives in rotting matter

◇ **saprobic** *adjective* referring to the classification of organisms according to the way in which they tolerate pollution; *see also* MESOSAPROBIC, OLIGOSAPROBIC, POLYSAPROBIC

◇ **saprogenous** *adjective* (organism) that grows on decaying matter

◇ **saprophagous** *adjective* (animal) which lives on decaying matter

◇ **saprophyte** *noun* organism (such as a fungus) which lives on dead or decaying tissue

◇ **saprophytic** *adjective* (organism) which lives on dead or decaying tissue

Sargasso Sea *noun* area of still water in the north Atlantic Ocean, which is surrounded by currents, and contains drifting waste matter

satellite *noun* (a) body which orbits round a larger body in space; *the Moon is the Earth's only satellite* (b) man-made device that orbits the earth, receiving, processing and transmitting signals and generating images such as weather pictures

saturate *verb* take up or dissolve the maximum amount of something, e.g. to fill a substance so that no more liquid can be absorbed; *nitrates leached from forest soils, showing that the soils are saturated with nitrogen*; **saturated fat** = fat which has the largest amount of hydrogen possible

COMMENT: animal fats such as butter and fat meat are saturated fatty acids, and contain large amounts of hydrogen. It is known that increasing the amount of unsaturated and polyunsaturated fats (mainly vegetable fats and oils, and fish oil), and reducing saturated fats in the food intake helps reduce the level of cholesterol in the blood

saturation *noun* (i) result of saturating; (ii) point where air contains 100% humidity; *the moisture in the air reached saturation point and fell as rain*

COMMENT: air has different saturation levels at different temperatures. The hotter the air temperature, the more moisture the air can contain

saturnism *noun* lead poisoning

savanna *noun* dry grass-covered plain with few trees (usually referring to South America or Africa)

scale *noun* (a) flake of tissue as on the skins of reptiles and fish; **scale insect** = flat parasitic insect that secretes a protective scale around itself and which lives on plants (b) calcium deposit which forms in pipes and kettles, caused by the hardness of the water (c) series of degrees of measurement; *the Celsius temperature scale runs from 0° to 100°*; **Modified Mercalli scale** = scale measurement of the damage caused by an earthquake; **Richter scale** = scale of measurement of the force of an earthquake, measured from zero to ten, with the strongest earthquake ever recorded being 8.9

◇ **scaly** *adjective* covered in scales

scar 1 *noun* mark left on the surface after a wound has healed; **scar tissue** = fibrous tissue which forms a scar **2** *verb* to leave a scar on the surface of something; *the landscape was scarred by open-cast mines*

scavenge *verb* to feed on dead and decaying matter

◇ **scavenger** *noun* (i) detritivore, organism such as a bacterium, fungus or worm which feeds on dead matter like leaf litter or refuse; (ii) mammal or bird which feeds on animals which have been killed by lions or other predators; (iii) generally, any organism which feeds on dead animals, dead plants or refuse left unconsumed by other organisms

◇ **scavenging** *noun* eating organic matter or dead animals; *vultures and hyenas sometimes feed by scavenging*; *precipitation scavenging* = removing particles of polluting substances from the air in the form of acid rain

QUOTE a few species in the community are carnivores and scavengers, and eat the animals that live off the bacteria

New Scientist

scenery *noun* appearance of the landscape

scent *noun* (i) pleasant smell; (ii) cosmetic substance which has a pleasant smell; (iii) smell given off by a substance which stimulates the sense of smell; *the scent of flowers makes some people sneeze*

schist *noun* type of metamorphic rock with flakes which make it split

Schistosoma or **Bilharzia** *noun* genus of fluke which enters the patient's bloodstream and causes bilharziasis

◇ **schistosomiasis** or **bilharziasis** *noun* types of tropical disease caused by flukes in the intestine or bladder

COMMENT: the larvae of the fluke enter the skin through the feet and lodge in the walls of the intestine or bladder. They are passed out of the body in excreta or urine and return to water, where they lodge and develop in the water snail, the secondary host, before going back into humans

school *noun* group of aquatic animals, such as fish or porpoises, which all move together and keep an equal distance apart

scion *noun* piece of a plant which is grafted onto a stock

-scope *suffix* referring to an instrument for examining by sight; *microscope* = instrument for examining very small objects

scorbutus or **scurvy** *noun* disease caused by lack of vitamin C or ascorbic acid which is found in fruit and vegetables

◇ **scorbutic** *adjective* referring to scurvy; see note at SCURVY

Scots pine *noun* common commercially grown European conifer

scrap *noun* waste materials; *50% of steel is made from recycled scrap; the old computers have been sold for scrap; the value of scrap metal is higher than you might think; municipal dumps have special containers for scrap paper* NOTE: no plural **2 verb** to demolish or to destroy something because it is no longer useful

scree *noun* loose rocks and stones covering the side of a mountain

screen *noun* hedge or row of trees grown to shelter other plants or to protect something from the wind or to prevent something from being seen **2 verb** to examine large numbers of people to test them for a disease; *the population of the village was screened for meningitis*

◇ **screening** *noun* testing large numbers of people to see if any has a certain type of disease

scrub *noun* small trees and bushes **2 verb** to clean sulphur and other pollutants from waste gases produced by power stations

◇ **scrubber** *noun* device for cleaning gases of pollutants

◇ **scrubland** *noun* land covered with small trees and bushes

◇ **scrub typhus** or **tsutsugamushi disease** *noun* severe form of typhus caused by Rickettsia bacteria, passed to humans by mites, found in South East Asia

QUOTE the vegetation is dominated by stands of pine with a thick understorey of evergreen scrub oaks and densely branched shrubs. This is the true scrub

Natural History

scurvy or **scorbutus** *noun* disease caused by lack of vitamin C or ascorbic acid which is found in fruit and vegetables

COMMENT: scurvy causes general weakness and anaemia, with bleeding from the gums, joints and under the skin. In severe cases the teeth drop out. Treatment consists of vitamin C tablets and a change of diet to include more fruit and vegetables

Se *symbol* for selenium

sea *noun* body of salt water, smaller than an ocean, which covers a large part of the earth; **sea breezes** = light winds which blow from the sea towards land, for example in the evening when the land cools; **sea fog** = fog which forms over the sea, especially when warm air is in contact with cold sea in early summer; **sea salt** = (i) crystals of sodium chloride, extracted from sea water; (ii) salt blown into the air from

the sea which has an effect on plants and buildings near the sea

◇ **seabed** *noun* bottom of the sea; *fish which feeds on minute debris on the seabed*

◇ **seabird** *noun* bird (such as a gull) which lives near the sea and lives on fish

◇ **seaboard** *noun* area of land along a stretch of sea; *the eastern seaboard of the USA*

◇ **seagull** *noun* general name for a number of species of birds which live by the sea and have a stout build, rather hooked bills and webbed feet

sea level *noun* altitude of the land at the edge of sea

COMMENT: taken as the base for references to altitude; a mountain 300m high is three hundred metres above sea-level; the Dead Sea is 395m below sea-level. Sea levels in general have risen over the past hundred years, and much more rapid rises are forecast if the greenhouse effect results in the melting of the polar ice caps

sea loch *noun* fjord, long inlet of the sea in Scotland

◇ **sea water** *noun* water in the sea

◇ **seaweed** *noun* general name for several species of large algae, growing in the sea and usually rooted to a surface

seam *noun* layer of mineral in rock beneath the earth's surface; *the coal seams are two metres thick; the gold seam was worked out some years ago*

season 1 *noun* (a) one of the four parts into which a year is divided (spring, summer, autumn, and winter) (b) time of year when something happens; *growing season* = time of year when a certain plant grows; *hunting season* = time of year when people are allowed to hunt; *rainy season* or *wet season* = time of year when most rain falls 2 *verb* to allow the sap in timber to dry so that the wood can be used; *the construction industry needs large quantities of properly seasoned wood*

◇ **seasonal** *adjective* referring to a season; occurring at a season; *seasonal changes in temperature; plants grow according to a seasonal pattern*

QUOTE during the breeding season, if weather conditions are favourable, the average territory provides enough food to sustain two adults and a brood of six young
Natural History

second 1 *noun* base SI unit of time equal to one sixtieth of a minute; unit of measurement of the circumference of a circle, equal to one sixtieth of a degree 2 *adjective* coming after the first

◇ **secondary** *adjective* (i) which comes after the first; (ii) (condition) which develops from

another condition (the primary condition); **secondary industry** = industry which uses basic raw materials to make manufactured goods; **secondary minerals** = minerals formed after chemical reactions have taken place in molten lava, or after weathering of primary minerals; **secondary particulates** = particles of matter formed in the air by chemical reactions such as smog; **secondary substances** = chemical substances found in plant leaves, believed to be a form of defence against herbivores; **secondary succession** = succession that takes place in an area where a natural community existed and was removed; **secondary treatment** = process in the treatment of sewage in which suspended solids are removed; *see also* PRIMARY

secrete *verb* (of a gland) to produce a substance such as a hormone or oil or enzyme

◇ **secretion** *noun* substance produced by a gland

sediment *noun* solid particles, usually insoluble, which fall to the bottom of a liquid

◇ **sedimentary** *adjective* which falls to the bottom of a liquid; **sedimentary cycle** = process by which sediment falls to the bottom of water, becomes rock, then is weathered to form sediment again; **sedimentary rock** = rock which has been formed from particles of rock often including organic material

◇ **sedimentation** *noun* (i) action of solid particles falling to the bottom of a liquid; (ii) one of processes in treatment of sewage; **sedimentation tank** = tank in which sewage is allowed to stand so that solid particles can sink to the bottom

seed 1 *noun* fertilized ovule which forms a new plant on germination; **seed bank** = (i) all the seeds existing in the soil; (ii) collection of seeds from plants, kept for research purposes; **seed leaf** = cotyledon or first thick leaf on a plant as it germinates 2 *verb* (a) to sow seeds in an area; *the area of woodland was cut and then seeded with pines; (of garden plant) to seed itself* = to sow seeds naturally and grow the following year; *the poppies seeded themselves all over the garden; several self-seeded poppies have come up in the vegetable garden* (b) to encourage rain to fall by flying over a cloud and dropping crystals onto it

◇ **seedling** *noun* very small plant which has just sprouted from a seed

◇ **seed tree** *noun* tree left standing when others are cut down, to allow it to seed the cleared land

seep *verb* (of a liquid) to flow slowly through a substance; *water seeped through the rock; chemicals seeped out of the container*

◇ **seepage** *noun* action of flowing slowly through a substance; **seepage tank** = tank attached to a septic tank, into which the liquids from the septic tank are drained

seiche *noun* tide in a lake, caused usually by the wind or by movements in water level

seismic *adjective* referring to earthquakes; **seismic wave** = shock wave which spreads out from the centre (or focus) of an earthquake

◇ **seismograph** *noun* instrument for measuring earthquakes; *see also* RICHTER

◇ **seismologist** *noun* scientist who studies earthquakes

◇ **seismological** *adjective* referring to the study of earthquakes

◇ **seismology** *noun* scientific study of earthquakes; **reflection seismology** = study of how pressure waves from seismic movements are reflected by rock structures in the earth

◇ **seismonasty** *noun* response of plants to a shock (as when the leaves of *Mimosa pudica*, or sensitive plant, fold up when touched)

select *verb* to make a choice or to choose some things but not others; **the strongest plants are selected for further breeding**

◇ **selection** *noun* act of choosing some things but not others; ; **artificial selection** = selection by people of individual animals or plants from which to breed further generations, because the animals or plants have useful characteristics; **natural selection** = evolution whereby the characteristics which help individuals to survive and reproduce are passed on to their offspring

◇ **selective** *adjective* which chooses only certain things and not others; **selective weedkiller** = weedkiller which is supposed to kill only certain plants and not others

QUOTE a species of small mammal has evolved selective resistance to venom

BBC Wildlife

selenium *noun* non-metallic trace element

NOTE: the chemical symbol is **Se**; atomic number is 34

self- *prefix* referring to oneself; **self-fertile** = (plant) which fertilizes itself by male gametes from its own flowers; **self-fertilization** = action of fertilizing itself; **self-pollination** = pollination of a plant by pollen from its own flowers; **self-purification** = ability of water to clean itself of polluting substances

◇ **self-regulating** *adjective* (ecosystem) which keeps itself in balance; **most tropical rainforests are self-regulating environments**

◇ **selfing** *noun* = SELF-FERTILIZATION

◇ **self-sterile** *adjective* (plant) that cannot fertilize itself from its own flowers

semi- *prefix* meaning half; **semi-arid** = partly arid (desert); **semi-permeable** = (membrane)

which allows a liquid to pass through, but not substances dissolved in the liquid

sensitive *adjective* (a) which can receive stimuli; **the leaves of the plant are sensitive to frost** (b) (apparatus) which can record very small changes; **the earthquake was a small one and only registered on the most sensitive equipment**

◇ **sensitivity** *noun* being able to respond to stimuli

◇ **sensitize** *verb* to make someone sensitive to a drug or allergen

◇ **sensory** *adjective* referring to the senses; **sensory adaptation** = any alteration in a receptor because of increased, decreased or prolonged stimulation

sepal *noun* green outer part surrounding a flower

separate *adjective* (things) which are apart or not together; **separate system** = drainage system where the sewage and rainwater are not collected together but drain through different channels

septic tank *noun* (i) waste tank for household sewage, constructed in the ground near a house not connected to the main drainage system; (ii) tank in which sewage is collected to begin its treatment by anaerobic bacteria

COMMENT: the sewage collects in the tank, the solids settle and are decomposed, and the liquid drains off into the soil or into a seepage tank

sere *noun & suffix* series of plant communities which succeed one another; **primary sere** = plant community that develops in a place where no plants have grown before (as on cooled lava); **hydrosere** = series of plant communities in a damp place; *see also* CLISERE, LITHOSERE, XEROSERE

sessile *adjective* (i) attached directly (not by a stalk) to a branch or stem; (ii) permanently attached to a surface

set aside *verb* to take a piece of arable land and allow it to lie fallow or to use it for other types of use (for example as woodland or for recreational use)

◇ **set-aside** *noun* using a piece of formerly arable land for another use (such as for arable use or for woodland or to lie fallow)

QUOTE the scheme will offer subsidies to farmers if they set aside - i.e. leave fallow - 20 per cent of their land for five years

Sunday Times

QUOTE agriculture is changing, in the form of set-aside policies for the reduction of overproduction and conservation of important habitats and landscape. Set-aside land must either be managed with green cover crops like clover and kept in good agricultural condition, or put to forestry, or used for non-farming purposes

Environment Now

QUOTE he will be setting aside some whole fields on poorer-yielding chalk soils, but mainly 15m headland strips adjacent to woodland which suffer from shading

Farmers Weekly

settle *verb* (a) to stop moving and stay in one place; *settled cultivators live in the south of the country*; *early nomadic herdsmen eventually settled as farmers* (b) (of sediment) to fall to the bottom of a liquid

◇ **settlement** *noun* (a) action of staying in one place (b) small village or colony where people have settled

Seveso *noun* town in Italy, scene of a disaster in 1976 when tetrachlorodibenzoparadioxin gas escaped from a chemical factory during the manufacture of 2,4,5-T

sewer *noun* large pipe or tunnel which takes waste water and refuse away from buildings

◇ **sewage** *noun* waste water and other refuse such as faeces, carried away in sewers; *raw sewage* = sewage which has not been treated in a sewage farm; *the municipality was accused of discharging raw sewage into the lake*; *sewage disposal* = removing sewage from buildings and passing it into a river or lake, etc.; *sewage farm* = place where sewage is treated chemically to make it safe to be used as fertilizer; *sewage farming* = using sewage as a fertilizer; *sewage gas* = gas (methane mixed with carbon dioxide) which is given off by sewage; *sewage treatment plant* = place where sewage is treated chemically to make it safe to be pumped into a river or the sea

◇ **sewerage** *noun* system of pipes and treatment plants which collect and dispose of sewage in a town

QUOTE Britain's coastal waters are now some of the worst for sewage pollution in the whole of Europe

QUOTE industry tips vast quantities of waste fluids into the domestic sewerage system. In some areas the industrial content of sewage is as high as 20%

Environment Now

COMMENT: modern sewage systems treat sewage in special plants. Some systems still remove sewage from houses and discharge it directly into the sea through outfall pipes. Apart from the health hazards to bathers and the possibility of contamination of shellfish, raw sewage helps the eutrophication of the sea, increasing the numbers of plankton and algae. Sewage can be safely treated by dilution in large bodies of water provided there is sufficient water available. Otherwise, a modern sewage treatment plant works by passing the sewage through a series of processes. It is first screened to remove large particles, then passed into sedimentation tanks where part of the solids remaining in the sewage settle. The sewage then continues into an aerator which adds air to activate the bacteria. The sewage then settles in a second sedimentation tank before being discharged into a river or the sea. Sludge which settles at the bottom of the sedimentation tanks is treated in digestion tanks where it is digested anaerobically by bacteria

sex *noun* one of two groups (male and female) into which animals and plants can be divided; *the relative numbers of the two sexes in the population are not equal, more males being born than females*; *sex organs* = organs which are associated with reproduction and sexual intercourse; *sex chromatin* = chromatin found only in female cells, which can be used to identify the sex of a baby before birth; *sex chromosome* = chromosome which determines if an organism is male or female; *sex determination* = way in which the sex of an individual organism is determined by the number of chromosomes which make up its cell structure

COMMENT: in mammals, individuals have either a pair of identical XX chromosomes (and so are female) or have one X and one Y chromosome and are male. Out of the twenty-three pairs of chromosomes in each human cell, only two are sex chromosomes. Females have a pair of X chromosomes and males have a pair consisting of one X and one Y chromosome. The sex of a baby is determined by the father's sperm. While the mother's ovum only carries X chromosomes, the father's sperm can carry either an X or a Y chromosome. If the ovum is fertilized by a sperm carrying an X chromosome, the embryo will contain the XX pair and so be female

sex-linkage *noun* existence of characteristics which are transmitted through the X chromosomes

◇ **sex-linked** *adjective* (i) (genes) which are linked to X chromosomes; (ii) (characteristics,

such as colour-blindness) which are transmitted through the X chromosomes

◇ **sexology** *noun* study of sex and sexual behaviour

◇ **sexual** *adjective* referring to sex; *a study of the sexual behaviour of moths*; **sexual reproduction** = reproduction in which gametes from two individuals fuse together

shade *noun* (a) place sheltered from direct sunlight; **shade plants** = plants which prefer to grow in the shade; **shade-tolerant tree** = tree (such as beech) which will grow in the shade of a larger tree; **shade intolerant tree** = tree (such as Douglas fir) which does not grow in the shade of other trees (b) relative darkness of a colour; *the new leaves are a light shade of green*

◇ **shading** *noun* (a) action of cutting off the light of the sun; *parts of the field near tall trees suffer from shading* (b) changing the strength of colours; **obliterative shading** = grading of the colour of an animal which minimizes relief and gives a flat appearance (as when the back of the animal is dark shading towards a light belly)

shale *noun* sedimentary rock formed from clay, which cracks along horizontal straight lines; **oil shale** = geological formation of sedimentary rocks containing oil, which can be extracted by crushing and heating the rock

shear waves *noun* type of slow seismic waves which alter direction as they pass through different types of rock (used in reflection seismology)

sheep *noun* group of mammals related to goats and cattle farmed for their wool and meat; **sheep farming** = raising sheep on a farm; **sheep station** = very large sheep farm in Australia

shell *noun* hard outer covering of an animal or egg or seed

◇ **shellfish** *noun* sea animals which live in shells

shelter 1 *noun* protection (from wind or sun, etc.); **shelter belt** = row of trees planted to shelter smaller crops from wind **2 verb** to protect something from sun or wind

◇ **shelterwood** *noun* large trees left standing when others are cut, to act as shelter for seedling trees

shield 1 *noun* large area of very old rocks (such as the Canadian Shield) **2 verb** to protect; *the plants grow in crevices shielded from the wind*; *ozone in the stratosphere shields the earth from solar ultraviolet radiation*

shingle *noun* pebbles found on beaches, between about 1 and 7 cm in diameter

shock *noun* sudden movement caused by pressure; **shock waves** = wave of high pressure which radiates out from a central source (such as an explosion); *see also* AFTERSHOCK

shore *noun* land at the edge of the sea or lake

◇ **shorebird** *noun* bird which lives and nests on the shore

◇ **shoreline** *noun* line of land at the edge of the sea

COMMENT: the shore is divided into different zones: the upper shore is the area which is only occasionally covered by seawater at the very highest tides; the middle shore is the main area of shore, which is covered and uncovered by sea at each tide; and the lower shore, which is very rarely uncovered and only at the lowest tides

short day plant *noun* plant (such as the chrysanthemum) which flowers as the days get shorter in the autumn

shower *noun* short fall of rain

shriveled *verb* to become dry and wrinkled

shrub *noun* low plant like a short tree

◇ **shrubby** *adjective* (plant) that grows like shrub

shut down *verb* to stop working

◇ **shutdown** *noun* action of shutting something down; **emergency shutdown** = rapid closing of a nuclear reactor if it seems that a dangerous emergency may take place

Si *chemical symbol* for silicon

SI *abbreviation* for *Système International*, the international system of metric measurements; **SI units** = international system of units for measuring physical properties (such as weight or speed or light, etc.); *see* SUPPLEMENT

sib or **sibling** *noun* brother or sister; one of the offspring of the same parents; *brothers and sisters are all siblings*; **sibling species** = species which look alike, but which cannot interbreed

sick *adjective* ill or not well; *half the forests in Germany are sick*; **sick building syndrome** = condition where many people working in a building feel ill or have headaches, caused by blocked air-conditioning ducts in which stale air is recycled round the building, often carrying allergenic substances or bacteria

-side *suffix* meaning the side or edge of something; *the eroded hillsides are scarred with gullies*; *waterside plants thrive in shade*

sievert *noun* unit of measurement of the absorbed dose of radiation (calculated as the amount of radiation from one milligram of radium at a distance of one centimetre for one hour)

NOTE: usually written **Sv** with figures

silage *noun* food for cattle, formed of grass and other green plants, cut and stored in silos

silencer *noun* device attached to a car exhaust which reduces the sound emitted

NOTE: US English is **muffler**

silica *noun* silicon dioxide, mineral which forms quartz and sand, and is used to make glass

◇ **silicate** *noun* (i) chemical compound of silicon and oxygen, the most widespread form of mineral being found in most rocks and soils; (ii) particles of silica found in clay

◇ **silicon** *noun* chemical element, which is found naturally in various compounds such as silica and is manufactured to produce silicon chips, used in the electronics industry

NOTE: the chemical symbol is **Si**; atomic number is **14**

◇ **silicosis** *noun* kind of pneumoconiosis or disease of the lungs caused by inhaling silica dust from mining or stone-crushing operations

COMMENT: this is a serious disease which makes breathing difficult and can lead to emphysema and bronchitis

silk *noun* thread made by an insect to prepare a cocoon or a web

silo *noun* large container for storing grain or silage

silt 1 *noun* (a) particles of mineral with a diameter of less than 0.02mm (b) (in general) soft mud which settles at the bottom of water **2 verb** (of a harbour or river) to **silt up** = to become full of silt, so that boats can no longer sail

◇ **siltation** or **silting** *noun* action of depositing silt at the bottom of water; **increased sedimentation and siltation in backwaters**

silver *noun* white-coloured metallic element, which is not corroded by exposure to air
NOTE: chemical symbol is **Ag**; atomic number is **47**

silvi- *prefix* referring to trees

◇ **silvicide** *noun* substance which kills trees

◇ **silviculture** *noun* growing of trees

similarity *noun* being similar; **similarity coefficient** = degree to which two areas of vegetation are similar

sink 1 verb to fall to the bottom of water **2 noun** (a) place into which substances pass to be stored or to be absorbed out of the atmosphere; **carbon sink** = part of the biosphere (such as a tropical forest) that absorbs carbon from the atmosphere; **heat sink** = place which can absorb extra heat; **the oceans may delay global warming by acting as a heat sink**; **oxygen sink** = part of a plant which stores oxygen (b) **sink hole** = low-lying piece of land where water collects to form a pond (c) chemical or physical action which removes a pollutant; **the commonest ozone sink is the reaction with nitric oxide to form nitrogen dioxide and oxygen**

QUOTE the main sink for CH₄ (methane) is reaction with atmospheric hydroxyl radicals

Nature

QUOTE if the oceans act as a huge sink for CO₂ estimates about how much the gas contributes to the greenhouse effect may have to be rethought

Farmers Weekly

Sirenians *noun* large marine animals (of the order Sirenia) living in warm estuaries, such as the manatee or sea cow

sirocco *noun* dry wind blowing from the desert northwards in North Africa

site 1 *noun* place or position of something or place where something happened; **the area around the nuclear test site is closed to the public**; **hazardous chemicals found on the site include arsenic, lead mercury and cyanide**; **Site of Special Scientific Interest (SSSI)** = small area of land which has been noted as particularly important by the Nature Conservancy Council, and which is preserved for its fauna, flora or geology; **nesting site** = place where a bird may build a nest **2 verb** to put something or to be in a particular place; **the nesting area is sited on the west side of the cliff**

Sitka spruce *noun* fast-growing temperate softwood tree, used for papermaking

skeleton *noun* all the bones which make up a body

◇ **skeletal** *adjective* referring to a skeleton; **skeletal muscle** or **voluntary muscle** = muscle which is attached to a bone, which makes a limb move

sky *noun* space above the earth, which appears blue during the daytime

◇ **skyline** *noun* line of hills or buildings seen against the sky; **the need to protect mountain skylines from planting of conifers**

COMMENT: the sunlight that strikes the atmosphere is scattered by the particles which it hits. The scattering affects short light waves most, hence the short blue light waves colour the sky

slag *noun* waste matter which floats on top of the molten metal during smelting, used to lighten heavy soils, such as clay, and also for making cement; **basic slag** = calcium phosphate or waste slag from blast furnaces, used as a fertilizer because of its phosphate content

slaked lime *noun* calcium hydroxide, mixture of calcium oxide and water, used to improve soil quality

slash *verb* to make a long cut with a knife; **slash and burn** = swidden farming, form of agriculture where forest is cut down and burnt to create open space for growing crops; the space is abandoned after several crops have been grown and further forest is cut down

slate *noun* hard metamorphic rock which splits easily along cleavage lines, used especially for making roofs

slaughter 1 *noun* killing of a large number of animals; **protesters tried to stop the annual slaughter of seals 2** *verb* to kill large numbers of animals

sleet 1 *noun* ice and rain mixed together **2** *verb* to fall as ice and rain together

slick *noun* oil slick = oil which has escaped into water and floats on the surface; **the slick contaminated over 40 miles of coast**

QUOTE as the slick moved down river, hundreds of thousands of residents were without water, schools and businesses closed
Environmental Action

slime *noun* algal substance, such as green algae, forming on damp stone surfaces

slough 1 *noun* dead tissue (especially dead skin) which has separated from healthy tissue **2** *verb* (of snake) to lose dead skin which falls off

sludge *noun* raw sludge = solid sewage which falls to the bottom of a sedimentation tank; **sewage sludge is dumped directly into the North Sea**; **sludge digestion** = final treatment of sewage when it is digested anaerobically by bacteria; **sludge gas** = sewage gas, methane mixed with carbon dioxide which is given off by sewage; **sludge gupser** = large truck which removes sludge from septic tanks

QUOTE sewage sludge dumping operations are conducted by the Thames Water Authority in the outer Thames estuary. Four purpose-built vessels dump up to 12,000 wet tonnes of treated sewage sludge daily
London Environmental Bulletin

sluice *noun* channel for water, especially channel for water through a dam

slurry *noun* (a) liquid waste from cattle, stored in tanks and treated to be used as fertilizer (b) **lime slurry** = mixture of lime and water added to hard water to make it softer

smelt *verb* to extract metal from ore by heating it

◇ **smelting** *noun* process of extracting metal from ore by heating

◇ **smelter** *noun* plant which smelts metal

smog *noun* pollution of the atmosphere in towns, caused by warm damp air combined with exhaust fumes from cars; **photochemical smog** = smog caused by bright sunlight acting on the chemical substances in the air to form pollutants

COMMENT: smog originally meant smoke and fog, and the London "pea-soupers" were caused by coal smoke in foggy weather in winter. Today's smog is usually caused by car exhaust fumes, and can occur in sunny weather. Temperature inversion (where the air temperature at ground level is colder than the air above) helps to form smog by making it impossible for the pollutants in the air to rise

smoke 1 *noun* white, grey or black product formed of small particles, given off by something which is burning; **the room was full of cigarette smoke**; **several people died from inhaling toxic smoke**; **smoke control area** = area of a town where it is not permitted to produce smoke from chimneys; **smoke stack** = tall chimney **2** *verb* (a) to emit smoke; **a smoking volcano** (b) to breathe in smoke from a cigarette, cigar, pipe, etc.; **she was smoking a cigarette**; **he only smokes a pipe**; **doctors are trying to persuade people to stop smoking**; **smoking can injure your health**

◇ **smokeless** *adjective* where there is no smoke or where smoke is not allowed; **smokeless or smoke-free area** = part of a public place (restaurant or aircraft, etc.) where smoking is not allowed; **smokeless fuel** = special fuel which does not produce smoke when it is burnt; **smokeless zone** = part of a town where open fires are not permitted

◇ **smoker** *noun* person who smokes cigarettes; **smoker's cough** = dry asthmatic cough, often found in people who smoke large numbers of cigarettes

◇ **smoking** *noun* action of smoking tobacco; **no smoking area** = section of a public place

(such as a restaurant) where smoking as not allowed **passive smoking** = inhaling smoke from other people who are smoking, even if you are not a smoker yourself

♦ **smoky** adjective full of smoke; (chimney) which makes a lot of smoke

COMMENT: the connection between smoking tobacco, especially cigarettes, and lung cancer has been proved to the satisfaction of the British government, which prints a health warning on all packets of cigarettes. Smoke from burning tobacco contains nicotine and other substances which stick in the lungs, and can in the long run cause cancer. By banning the use of fuels which create smoke, the air above towns has become much cleaner than it was some years ago. This has the disadvantage of allowing the sunlight to penetrate and cause photochemical reactions to take place, increasing the acidity of the atmosphere, with the result that apparently clean air can be as dangerous as smog

smut noun (a) black flake of oily carbon emitted from a fire; **smuts from the oil depot fire covered the town** (b) disease of cereal plants, caused by a fungus, which covers the plant with black spots

Sn chemical symbol for tin

snow 1 noun water which falls as white flakes of ice crystals in cold weather; **snow blindness** = temporary painful blindness caused by bright sunlight shining on snow 2 verb to fall as snow; **it snowed heavily during the night**

♦ **snowfall** noun fall of snow; **a heavy snowfall blocked the main roads**

♦ **snowline** noun line on a high mountain above which there is permanent snow

♦ **snowstorm** noun heavy fall of snow accompanied by wind

♦ **snowy** adjective (weather) when a lot of snow falls

COMMENT: snow is formed when the atmospheric temperature is cold enough to make the moisture in clouds freeze into ice crystals

soak verb to put something in liquid, so that it absorbs some of it

♦ **soakaway** noun hole in the ground filled with gravel, which takes rainwater from a downpipe and allows it to soak into the surrounding soil

soar verb (of bird) using updraughts of warm air to fly higher or stay airborne without any movement of the wings

social adjective referring to society or to groups of animals or people; **social animals** =

animals which live in organized societies (such as ants or bees); **social medicine** = medicine as applied to treatment of diseases which occur in certain social groups; **social parasite** = parasite that benefits from the host's normal behaviour (such as the cuckoo which lays its eggs in other birds' nests and allows the other birds to raise its young); **social responsibility** = sense of responsibility to society for environmental or medical effects of pollution or industrial processes

society noun (i) group of animals which live together in an organized way; (ii) group of plants within a larger community; (iii) group of people who live together and have the same laws and customs

sociology noun study of human societies; **plant sociology** = study of communities of plants

soda lake noun salt lake with a high proportion of sodium in the water; *see also* CAUSTIC SODA

sodium noun chemical element which is the basic substance in salt (NOTE: chemical symbol is Na; atomic number is 11) **sodium balance** = balance maintained in the body between salt lost in sweat and urine and salt taken in from food; the balance is regulated by aldosterone; **sodium chlorate** = herbicide which is taken up into the plant through the roots; **sodium chloride** = common salt; **sodium hydroxide** = caustic soda, compound of sodium and water, used to make soap and to clear blocked drains

soft adjective not hard; **soft water** = water which does not contain calcium and other minerals which are found in hard water

♦ **soften** verb to make or become soft

♦ **softwood** noun white wood from pine trees and other conifers; **softwoods** = (forests of) pine trees

NOTE: the opposite is **hardwood**

soil noun earth in which plants grow; **rich soil** = soil with many useful nutrients in which plants grow well; **poor soil** = soil with few useful nutrients and so less suitable for plants; **soil conservation** = keeping soil as it is by irrigation, planting and mulching, and preventing it being eroded; **soil creep** = slow movement of soil downhill; **soil drainage** = drainage of water from soil (either naturally or by putting pipes and drainage channels into the soil); **soil erosion** = removal of soil by natural means (such as being removed by water or by wind); **soil flora** = minute plants (such as fungi and algae) which live in the soil; **soil horizons** = different layers present in soil (the topsoil containing humus, the subsoil containing minerals leached from the topsoil, etc.); **soil map** = map showing the different types of soil found in an area; *see also*

CHERNOZEM, LOESS, PODZOL, SUBSOIL, TOPSOIL.

◇ **soiless gardening** *noun* hydroponics, growing plants in vermiculite or other substances which are not soil

COMMENT: soil is a mixture of mineral particles, decayed organic matter and water. Topsoil contains chemical substances which are leached through into the subsoil where they are retained. Soils are classified either according to the areas of the world in which they are found, or according to the types of minerals and stage of development which a soil has reached

solar *adjective* (a) referring to the sun; **solar cell** = photoelectric device which converts solar energy into electricity; *see also* PHOTOVOLTAIC CELL; **solar collector** = device with a dark surface which collects radiation from the sun and uses it to warm water; **solar eclipse** = eclipse of the sun (when the moon passes between the earth and the sun during the daytime, so cutting off the sun's light for a short time); **solar energy** or **solar power** = electricity produced from the radiation of the sun; **solar flare** = sudden eruption of bright radiation from the sun which affects radio waves, and is associated with sunspot activity; **solar panel** = solar collector; **solar radiation** = rays which are emitted by the sun; **solar system** = arrangement of planets which orbit round the sun (b) driven by power from the sun; **solar cooker** = cooking stove which directs the rays of the sun to the pot in which food is cooked; **solar drier** = device for drying crops using the heat of the sun; **solar-generated energy** = energy generated using solar power; **a solar-generated steam pump**

◇ **solarization** *noun* exposing to the rays of the sun, especially killing pests in the soil by covering the soil with plastic sheets and letting it warm up in the sunshine

QUOTE solar power sources and heat pumps may supplement the main energy system, but they do not result in sufficient saving in fuel cost to cover the capital expenditure in this country

Environment Now

COMMENT: the sun emits radiation in the form of ultraviolet rays, visible light and infrared heating rays. Solar energy can be collected by various methods, most often by heating water which is then passed into storage tanks. Although solar power is easy to collect, the problem of storing it is important in order to make sure that the power is available for use during the night or when the sun does not shine

solid 1 *adjective* hard or not liquid; **water turns solid when it freezes**; **solid food** or **solids** = food which is chewed and eaten, not drunk;

solid waste = waste matter which is hard, and not liquid 2 *noun* substance which has volume and a shape (as opposed to liquid or gas); **the first treatment of sewage involves removing the solids**

◇ **solidification** *noun* becoming solid

◇ **solidify** *verb* to become solid; **carbon dioxide solidifies at low temperatures**

solstice *noun* one of the two times of year when the sun is at its furthest north or south of the equator; **summer solstice** = 21st June (the longest day in the Northern Hemisphere); **winter solstice** = 21st December (the shortest day in the Northern Hemisphere)

soluble *adjective* which can dissolve in a liquid

◇ **-soluble** *suffix* meaning which can be dissolved in; **fat-soluble** or **water-soluble** = which is soluble in fat or water

◇ **solute** *noun* solid substance which is dissolved in a solvent to make a solution

◇ **solution** *noun* (i) mixture of water and another chemical substance; (ii) mixture of a solid substance dissolved in a liquid

solum *noun* technical word for soil, including both topsoil and subsoil

solvent *noun* liquid in which a solid substance can be dissolved; **carbonic acid can act as a solvent for limestone**

somatotropin *see* BOVINE SOMATOTROPIN

sonar *noun* device for finding objects under water by sending out sound waves (in the same way as radar finds objects by sending out radio waves)

sonde *noun* device for measuring and taking samples of the atmosphere, sent up attached to a balloon

sonic *adjective* referring to sound waves; **sonic boom** = loud noise made by the shock waves from an aircraft as it travels faster than the speed of sound

soot *noun* black deposit of carbon formed by smoke (it collects on surfaces, such as the inside of chimneys); **legislation to control soot emission**

sorghum *noun* type of cereal plant grown in warm climates

source *noun* (a) substance which produces something; place where something comes from; **hot rocks are a potential energy source**; **plants tend to turn towards the source of light** or **towards the light source** (b) place where a river starts to flow; **the source of the Nile is in the mountains of Ethiopia**

south *adjective & noun* direction towards the South Pole; **South Pole** = point which is the furthest south on the earth

◇ **southerly** *adjective* towards the south, (wind) blowing from the south; *the typhoon is moving in a southerly direction at 25 knots*; the **southerlies** = winds which blow from the south

◇ **southern** *adjective* in the south; **southern oscillation** = regular cycle by which air is exchanged between the Pacific basin and the Indian Ocean, occurring every two to five years, and linked to the El Niño effect

sow *verb* to put seeds into soil so that they will germinate and become plants

soya *noun* plant which produces edible beans which have a high protein and fat content and very little starch

◇ **soybean** or **soyabean** *noun* bean from a soya plant

space *noun* place or empty area between things; **outer space** = area outside the earth's atmosphere in which planets and the stars move

sparse *adjective* with only a small number of items in a given area; *a few sparse bushes in the desert*; *a sparse population of herdsmen*

◇ **sparsely** *adverb* not densely; *a sparsely populated mountain region*

spawn 1 *noun* (a) mass of eggs (of a fish or reptile) (b) **mushroom spawn** = spores of the edible mushroom which are sold to be used to propagate mushrooms 2 *verb* (of a fish or reptile) to produce a large mass of eggs; **spawning grounds** = areas of the sea where fish return each year to spawn

special *adjective* which refers to one particular thing or which is not ordinary

◇ **specialist** *noun* (a) person who specializes in a certain branch of study; *they have called in a contamination specialist to study the problem* (b) organism which only lives on one type of food or in a very restricted area

◇ **specialization** *noun* (i) act of specializing in a certain branch of science; (ii) particular branch of science in which a person specializes

◇ **specialize in** *verb* to study one particular area of science; *he specializes in the study of conifers*

◇ **speciality** *noun* particular branch of scientific study

species *noun* division of a genus, a group of living things which can interbreed NOTE: plural is **species**

◇ **speciation** *noun* process of forming a new species

QUOTE there are about 35 species of sea-horses, all in the genus *Hippocampus*. Together with several hundred species of pipefish they form the family Syngnathidae
BBC Wildlife

specific *adjective* (a) which is characteristic of something; **specific gravity** = measure of the density of a substance; **specific humidity** = ratio of the mass of water vapour in a given quantity of air to the mass of the air (b) referring to a species; **specific name** = name by which a species is differentiated from other members of the genus (it is the second name in the binomial classification system, the first being the generic name which identifies the genus)

◇ **specificity** *noun* being specific; *parasites show specificity in that they live on only a certain limited number of hosts*

specimen *noun* (i) one item out of a group; (ii) small quantity of something given for testing; *fine specimens of salmon can still be found in the mountain rivers*; *scientists have taken away soil specimens for analysis*

spectrography *noun* recording of a spectrum on photographic film

◇ **spectroscope** *noun* instrument used to analyse a spectrum

◇ **spectrum** *noun* range of colours (from red to violet) into which white light can be split (different substances in solution have different spectra) NOTE: the plural is **spectra**

spell *noun* short period when the weather does not change; *there will be some fine spell over the east of the country*; *the south has experienced the longest spell of rainy weather since records were first taken*

spent fuel *noun* fuel which has been used in a nuclear reactor, but which is still fissile and can be reprocessed; *tonnes of spent nuclear fuel are sent for reprocessing*

sperm *noun* spermatozoon or male sex cell; **sperm bank** = collection of sperm from donors, kept until needed for artificial insemination; **sperm count** = calculation of the number of sperm in a quantity of semen NOTE: no plural

◇ **spermat-** or **spermato-** *prefix* referring to sperm

◇ **spermatic** *adjective* referring to sperm

◇ **spermatid** *noun* immature cell, formed from a spermatocyte, which becomes a spermatozoon

◇ **spermatoocyte** *noun* early stage in the development of a spermatozoon

◇ **spermatogenesis** *noun* formation and development of spermatozoa

◇ **spermatogonium** *noun* cell which forms a spermatoocyte

◇ **spermatozoon** or **sperm** *noun* mature male sex cell, which is capable of fertilizing an ovum NOTE: plural is **spermatozoa**

◇ **spermicide** *noun* substance which kills sperm

COMMENT: a spermatozoon is very small, and comprises a head, neck and very long tail. It can swim by moving its tail from side to side

sphagnum *noun* type of moss which grows in bogs: **sphagnum peat** = peaty soil made up of dead sphagnum moss

spider *noun* one of a large group of animals, with two pairs to their bodies and eight legs

spike *noun* tall pointed inflorescence

spill 1 *noun* liquid which has escaped from a container; oil **spill** = escape of oil into the environment (as from a tanker which hits rocks or from a ruptured pipeline) 2 *verb* to escape from a container; *he spilled the bottle of herbicide on the grass; about 200,000 barrels of oil spilled into the sea*

◇ **spillage** *noun* act of spilling; escape of a liquid from its container; *spillage of the river into the nearby desert areas*

◇ **spillway** *noun* channel down which water can overflow from the reservoir behind a dam

spirochaete *noun* bacterium with a spiral shape

spoil *noun* rubbish and waste minerals dug out of a mine; **spoil bank** = heap of waste soil produced in surface mining and deposited at the side of the worked coal seam

spore *noun* reproductive body of certain plants and bacteria, which can survive in extremely hot or cold conditions for a long time

◇ **sporicidal** *adjective* which kills spores

◇ **sporicide** *noun* substance which kills spores

◇ **Sporozoa** *noun* type of parasitic Protozoa which includes Plasmodium, the cause of malaria

COMMENT: spores are produced by plants such as ferns or by algae and fungi. They are microscopic, and float in the air or water until they find a resting place where they can germinate

sprawl *noun* something which stretches out in a disorderly way; **urban sprawl** = mass of houses built without any particular plan

spray 1 *noun* (a) mass of tiny drops of liquid (b) special liquid for spraying onto a plant to prevent insect infestation or disease 2 *verb* to

send out a liquid in fine drops; *they sprayed the room with disinfectant; apple trees must be sprayed twice a year to kill aphids*

spread *verb* to go out over a large area; *the locusts spread right across the country*

spring *noun* (a) place where water comes naturally out of the ground; *the first settlers found springs of fresh water in the mountains* (b) the first season in the year (around April in the Northern Hemisphere); **spring equinox** = March 21st, one of the two times of year when the sun crosses the celestial equator

◇ **spring tides** *noun* tides which occur at the full and new moon, when the influence of the sun and moon act together, giving tides which are higher and lower than normal; *compare NEAP TIDES*

sprout 1 *noun* little shoot from a plant, with a stem and small leaves 2 *verb* (of plants) to send out new growth

spruce *noun* temperate softwood tree

squall *noun* sharp gust of wind

◇ **squally** *adjective* (weather) which is characterized by sharp gusts of wind

Sr *symbol* for strontium

SSSI = SITE OF SPECIAL SCIENTIFIC INTEREST

stable *adjective* not changing; *in parts of South East Asia temperatures remain stable for most of the year; stable climax* = more or less stable community of plants and animals in equilibrium with its environment, the final stage of an ecological succession; **stable population** = population which remains at the same level, where births and deaths are equal

◇ **stability** *noun* being stable or resisting any change

◇ **stabilization lagoon** *noun* pond used to purify sewage in warm countries by allowing sunlight to fall on the mixture of sewage and water

◇ **stabilize** *verb* to make something stable; to become stable; *marram grass was planted on the sand dunes to stabilize them*

◇ **stabilizer** *noun* (a) artificial substance added to processed food to keep the mixture stable (as in sauces containing water and fat); in the EC emulsifiers and stabilizers have E numbers E322 - E495 (b) artificial substance added to plastics to prevent degradation

stack *noun* chimney stack = very tall chimney as in a factory, usually containing several flues; *the use of high stacks in power stations means that pollution is now more widely spread*

stain 1 *noun* (a) coloured mark on a surface (b) dye or substance used to give colour to tissues which are going to be examined under the microscope **2** *verb* (a) to make a coloured mark on a surface; *peaty water stains the rocks brown* (b) to treat a piece of tissue with a dye to increase contrast before it is examined under the microscope

◇ **staining** *noun* colouring of tissue or bacterial samples, etc., so as to examine them and to identify them under the microscope

stalactite *noun* long pointed growth of mineral from the ceiling of a cave, formed by the constant dripping of water which is rich in minerals

◇ **stalagmite** *noun* growth of mineral from the floor of a cave, formed by water dripping from the tip of a stalactite

QUOTE the sediments that build up on cave floors and the accumulating layers of stalactites and stalagmites, record what is happening to the climate along similar lines to the annual rings in trees, but going back for many thousands of years

New Scientist

stalk *noun* thin stem which attaches a leaf or flower to the main part of a plant

stamen *noun* male part of a flower consisting of a stalk (the filament) bearing a container (the anther) in which pollen is produced

stamp out *verb* to remove completely; *international organizations have succeeded in stamping out smallpox; the government is trying to stamp out pollution from waste disposal units*

stand *noun* group of plants growing together; (in a forest) group of standing trees; *softwoods from the vast conifer stands in Scandinavia could be widely used in place of hardwood*

standard 1 *adjective* normal; *it is the standard practice to monitor the pollution levels twice a day 2* *noun* something which has been agreed upon and is used to measure other things by; *effluent standard* = amount of sewage which is allowed to be discharged into a river or the sea; *emission standard* = amount of a pollutant which is allowed to be released into the environment

standing *adjective* growing upright; *standing crop* = (i) crop (such as corn) which is growing upright in a field; (ii) the numbers and weight of the living vegetation of an area, calculated by weighing the vegetation growing in a sample section; *standing timber* = trees which are growing in a wood, ready to be felled

staphylococcal *adjective* referring to Staphylococci; *staphylococcal poisoning* =

poisoning by Staphylococci which have spread in food

◇ **Staphylococcus** *noun* bacterium which grows in a bunch like a bunch of grapes, and causes food poisoning

NOTE: plural is **Staphylococci**

starch *noun* substance found in green plants, the usual form in which carbohydrates exist in food, especially in bread, rice and potatoes

◇ **starchy** *adjective* (food) which contains a lot of starch

COMMENT: starch is present in common foods and is broken down by the digestive process into forms of sugar

starfish *noun* one of a group of flat sea animals, characterized by five arms branching from a central body

starvation *noun* having had very little or no food; *starvation diet* = diet which contains little nourishment, and is not enough to keep a person healthy

◇ **starve** *verb* to have little or no food or nourishment; *thousands of people were starving in the desert*

stasis *noun* state when there is no change or growth

◇ **static** *adjective* which is in a stable state or which is not moving or growing; *static electricity* = electricity which is in a static state as opposed to electricity which is flowing in a current

station *noun* geographical place where something exists; *field station* = scientific research centre located in the area being researched

statistics *plural noun* collection of measurements taken from samples of populations; *population statistics show that the birth rate is slowing down*

stator *noun* (in a generator) the fixed casing in which the rotor turns

stem *noun* piece of plant tissue which holds the plant upright or which bears the leaves and flowers

steno- *prefix* meaning (i) narrow; (ii) constricted

◇ **stenohaline** *adjective* (substance) which cannot stand changes in salinity

◇ **stenothermous** *adjective* (organism) which cannot stand changes of temperature

NOTE: opposites are **euryhaline**, **eurythermous**

steppe *noun* wide grassy plain, with no trees, found in Asia

sterile *adjective* (a) with no microbes or infectious organisms (b) infertile or not able to produce offspring

◇ **sterility** *noun* (i) being free from germs; (ii) infertility or being unable to produce offspring

◇ **sterilization** *noun* (i) action of making soil, etc., free from bacteria; (ii) action of making an organism unable to produce offspring

◇ **sterilize** *verb* (a) to make something sterile (by killing microbes or bacteria); *the soil needs to be sterilized before being used for intensive greenhouse cultivation* (b) to make an organism unable to have offspring

stimulate *verb* to make an organism or organ react or respond

◇ **stimulus** *noun* something (light or heat or noise) which makes an organism react NOTE: the plural is **stimuli**

sting 1 *noun* (a) organ with a sharp point, used by insects to pierce the skin and inject poison (b) piercing of the skin by an insect which passes, a toxic substance into the bloodstream 2 *verb* (of an insect) to make a hole in the skin and pass a toxic substance into the blood

COMMENT: stings by some insects, such as the tsetse fly, can transmit a bacterial infection. Other insects, such as bees, have toxic substances which they pass into the bloodstream of the victim, causing irritating swellings. Some people are particularly allergic to insect stings

stock *noun* (a) animals or plants which are derived from an ancestor; *stock farming* = breeding livestock for sale; *see also LIVESTOCK, ROOTSTOCK* (b) plant with roots on which a piece of another plant (the scion) is grafted; *stock culture* = basic culture of bacteria from which other cultures can be taken (c) quantity of something held for future use; *stocks of herring are being decimated by overfishing*

◇ **stockman** *noun* farm worker who looks after animals, especially cattle

stoma *noun* pore in a plant, especially in the leaves

NOTE: plural is **stomata**

COMMENT: the stomata are the holes through which a plant takes in carbon dioxide and sends out oxygen

stone *noun* mineral formation; single piece of mineral; *the houses are built directly on stone and should withstand earthquakes; the glaciers left heaps of stones as they retreated*

◇ **stony** *adjective* covered with stones

store *verb* to keep something until it is needed; *whales store energy in the blubber under the skin*

◇ **storage** *noun* keeping something until it is needed; *the problem of wind power is the question of storage of electricity for use when there is no wind*; *thermal storage* = storing heat created during a period of low consumption until a peak period when it is needed

storm *noun* violent weather, with wind and rain or snow; *there was a rainstorm during the night*; *snowstorms swept the northern American states*; *storm centre* = low pressure point in the centre of a cyclone; *storm drain* = large drain for taking away heavy storm water in tropical countries; *storm sewage* = sewage mixed with storm water after a heavy rainfall; *storm surge* = rush of water in a tide, pushed by the strong winds in a storm; *storm water* = water which falls as rain during a storm, and which is cleared by storm water channels

strain *noun* distinct variety of a species, which will breed true, usually referring to cultivated plants; *they have developed a new strain of virus-resistant rice*

strata *see* STRATUM

stratified *adjective* made of several layers

◇ **stratification** *noun* formation of several layers (of sedimentary rocks or of water in a lake or of stable air in the atmosphere)

◇ **stratigraphy** *noun* science of studying rock strata; *glacial stratigraphy* = studying layers of polar ice to discover information about climatic conditions when the ice was formed thousands of years ago

◇ **stratocumulus** *noun* layer of small cumulus clouds lower than altocumulus, that is below 3,000 metres

◇ **stratopause** *noun* thin layer of the atmosphere between the stratosphere and the mesosphere

◇ **stratosphere** *noun* zone of the earth's atmosphere above the troposphere and the tropopause, and separated from the mesosphere by the stratopause

◇ **stratospheric** *adjective* referring to the stratosphere; *CFCs are responsible for damage to the ozone in the earth's stratospheric zone*

COMMENT: the stratosphere rises from about 18km to 50km above the surface of the earth. It is formed of nitrogen (80%), oxygen (18%), ozone, argon and trace gases. The ozone in it forms the ozone layer

stratum *noun* layer (especially of rock)

NOTE: the plural is **strata**

stratus *noun* type of grey cloud, often producing light rain

straw *noun* dry stems of corn and other crops

COMMENT: straw can be ploughed back into the soil, or is in some cases burnt as stubble. It can be compressed into bundles to act as fuel and could be used for heating farms and small local industrial premises

stream *noun* flow of water or air; *a stream of hot gas turns the turbine; mountain streams have cut deep gullies in the hillside; Gulf Stream* = current of warm water flowing north along the east coast of America and crossing the Atlantic Ocean to hit Northern Europe; *jet stream* = stream of fast-moving air occurring at the top limit of the troposphere

◇ **streamflow** *noun* flow of water in a stream, as the flow of drinking water in the domestic water supply

streptococcus *noun* genus of bacteria which grows in long chains, and causes fevers such as scarlet fever, tonsillitis and rheumatic fever NOTE: plural is **streptococci**

◇ **streptococcal** *adjective* (infection) caused by a streptococcus

stress 1 *noun* condition where an outside influence changes the composition or functioning of something; **human-induced stress** = stress in animals caused by humans (such as ringing birds or driving cars in deer parks, etc.) 2 *verb* to subject something to stress

QUOTE a fatal sequence of stresses may begin with a predisposing stress such as shortage of nutrients. The tree may then be weakened by an inciting stress, such as a severe winter. It is then defenceless against a final contributing stress, such as disease or insect attack, which is the actual cause of death

Scientific American

striation *noun* mark of a scratch; **glacial striations** = marks on rocks made by moving glaciers

strip 1 *noun* long thin flat piece; **strip cultivation** = method of communal farming where each family has a long strip or strips of land to cultivate; **strip farming** = method of farming where strips of land across the contours are planted with different crops 2 *verb* to remove a covering from something; *spraying with defoliant strips the leaves off all plants*; **nutrient stripping** = removal of nutrients from sewage to prevent eutrophication of water in reservoirs

◇ **strip mining** *noun* method of surface mining (on a sloping surface), where the top layer of soil and rock is pushed down the side of the slope to expose the mineral seam; see also OPEN-CAST MINING

strontium *noun* metallic element; **strontium-90** = isotope of strontium which is formed in nuclear reactions and, because it is part of the fallout of nuclear explosions, can enter the food chain, attacking in particular animals' bones

NOTE: the chemical symbol is **Sr**; atomic number 38

structure *noun* way in which things are spaced, formed, shaped, etc.; **ecological structure** = spatial and other arrangements of species in an ecosystem; **soil structure** = way in which soil particles are joined together (i.e. loose, firm, etc.)

stubble *noun* short stems left in the ground after a crop of wheat or other cereals has been cut; **stubble burning** = method of removing dry stubble by burning it before ploughing; **stubble field** = field in which the crop has been harvested and the stubble left in the ground; *the animals are driven into the stubble fields to graze after the harvest*

COMMENT: stubble burning has the advantage of removing weed seeds and creating a certain amount of natural fertilizer which can be ploughed into the soil. The disadvantage is that it pollutes the atmosphere with smoke, releasing large amounts of carbon dioxide. This, together with the possible danger that the fire may get out of control, killing small animals and burning trees and crops, means that it is not recommended as a means of dealing with the stalks of harvested plants

stunt *verb* to reduce the growth of something; *the poor mountain soil supports a few stunted trees*

sub- *prefix* meaning (i) less important; (ii) underneath; **subarctic regions** = regions near the arctic regions; **subcloud layer** = the air immediately underneath a cloud layer

◇ **subclimax** *noun* stage in the development of a plant community where development stops before climax

◇ **subcontinent** *noun* very large land mass, attached to a continent; *the Indian subcontinent*

◇ **subdivision** *noun* section of a division in the animal kingdom

◇ **subdominant** *adjective* (species) which is not as important as the dominant species

◇ **subduct** *verb* to pull something underneath; *the oceanic crust is being subducted under the continents which surround it*

◇ **subduction** *noun* process by which a plate, such as the oceanic crust, slowly sinks under another plate

sublimate 1 *noun* gas produced during sublimation 2 *verb* (of a solid) to become gaseous, without first becoming liquid

◇ **sublimation** *noun* conversion of a solid into a gas directly, without it becoming liquid

sublittoral *adjective* (zone or water) which is further from a shore than the littoral zone; **sublittoral plants** = plants that grow near the sea

submarine *adjective* beneath the sea; *corals forming submarine reefs; shellfish collect round warm submarine vents*

submerge *verb* to cover something with water; *the coast is dangerous, with submerged rocks near the harbour*

submicroscopic *adjective* even smaller than microscopic

subside *verb* to go down or to become less violent; *after the rainstorms passed, the flood waters gradually subsided*

◇ **subsidence** *noun* (a) lowering (of a piece of ground); *subsidence caused by the old mine shaft closed the main road* (b) gradual movement downwards of a mass of air; **subsidence inversion** = phenomenon produced when a mass of air subsides gradually and becomes warmer

subsistence *noun* existing or surviving, with very little food; **subsistence farming** = growing just enough crops to feed the farmer and his family **subsistence food** = food which is needed to keep a person alive

QUOTE pollution from suspended sediments and heavy metals exceeds US Environmental Protection Agency standards and threatens subsistence staples (such as fish and crustaceans)

Ecologist

subsoil *noun* layer of soil under the topsoil, which contains little organic matter and into which chemical substances from the topsoil are leached; **subsoil water** = water held in the subsoil

subspecies *noun* group of organisms which is part of a species, but which shows slight differences from the main group, with which it can still interbreed

substance *noun* chemical material; *toxic substances released into the atmosphere*

substitution *noun* replacing one thing with another; **substitution effect** = the effect on the environment of substituting one form of action for another

◇ **substitute** 1 *noun* thing used in place of another; **sugar substitutes** = sweeteners (such as saccharin) used in place of sugar 2 *verb* to replace one thing with another; *farmers have been told to plough up pastureland and substitute woodlots*

substrate *noun* (a) substance which is acted on by an enzyme (b) matter or surface on which an organism lives

◇ **substratum** *noun* layer of rock beneath the topsoil and subsoil

subtropics *noun* area between the tropics and the temperate zone

◇ **subtropical** *adjective* referring to the subtropics; *the islands enjoy a subtropical climate; subtropical plants grow in the sheltered parts of the coast; subtropical high* = area of high pressure found in the subtropics

suburb *noun* residential part of a town, away from the centre, but still within the built-up area

◇ **suburban** *adjective* referring to the suburbs

succession *noun* series of stages, one after the other by which a plant community reaches its final stable state (or climax); **biotic succession** = changes which take place in a group of organisms under the influence of their changing environment; **ecological succession** = series of communities of organisms which follow one another in an area until a stable climax community is formed

◇ **successive** *adjective* (things) which follow one after the other

succulent *adjective & noun* (plant, such as a cactus) which has fleshy leaves or stems in which it stores water

suffer *verb* to experience something painful or unpleasant; *the town suffers from pollution from the nearby chemical works; the whole region is suffering from drought*

sufficiency *noun* having enough of something

suffruticose or **suffrutescent** *adjective* (perennial) plant which has a woody base to its stem and does not die down to ground level in winter

sugar *noun* sucrose, sweet substance ($C_{12}H_{22}O_{11}$) obtained from sugar cane

sullage *noun* (i) mud brought down by mountain streams; (ii) liquid waste from a house

sulphate or **US sulfate** *noun* salt of sulphuric acid and a metal (SO_4^{2-})

◇ **sulphide** *noun* ion of sulphur (S^{2-}) which is present in chemical compounds and mineral ores

◇ **sulphite** or **US sulfite** *noun* salt of sulphuric acid (SO_3^{2-}) which forms part of several chemical compounds which are used in processing paper

◇ **sulphonator** *noun* apparatus for adding sulphur dioxide to water to remove excess chlorine

◇ **sulphur** or **US sulfur** *noun* yellow non-metallic chemical element which is essential to biological life (it is found in volcanoes, in limestone, and is contained in some amino acids widely present in fossil fuels, which when burnt release sulphur dioxide and sulphur trioxide into the atmosphere); **sulphur cycle** = process by which sulphur flows from the environment, through organisms and back to the environment again; **sulphur oxides** = sulphur dioxide and sulphur trioxide, both of which are present in sulphur pollution; **sulphur dioxide** = unpleasant smelling gas (SO_2) formed when sulphur is burnt with oxygen (as when fuels are burnt); **sulphur trioxide** = gas (SO_3) formed when fuels are burnt, and which is usually present in sulphur oxide pollution (and forms sulphuric acid when dissolved in water) NOTE: chemical symbol for sulphur is **S**; atomic number is **16**. Note also that words beginning **sulph-** are spelt **sulf-** in US English

COMMENT: sulphur dioxide produced from burning coal or oil is an important cause of smog. Today the level of sulphur dioxide has fallen with the reduction in the use of coal, and this type of pollution has been replaced by nitrogen dioxide produced by car exhausts

sulphuric acid *noun* acid formed from sulphur dioxide (H_2SO_4), which forms in the atmosphere and is a nutrient for some types of plant (it is used to make chemical fertilizers and also in the plastics industry)

summer *noun* season of the year, when the weather is warmest, when the sun is highest in the sky and when plants flower and set seed; **summer solstice** = 21st June, the longest day in the Northern Hemisphere, when the sun is at its furthest point south of the equator

sun *noun* very hot star round which the earth and other planets orbit and which gives energy in the form of light and heat

◇ **sunburn** *noun* damage to the skin by excessive exposure to sunlight

◇ **sunburnt** *adjective* (skin) made brown or red by exposure to sunlight

◇ **sunglasses** *plural noun* dark glasses which are worn to protect the eyes from the sun

sunlight *noun* light from the sun; *he is allergic to strong sunlight*

COMMENT: sunlight is essential to give the body vitamin D. Excessive exposure to sunlight will not simply turn white skin brown, but may also burn the surface of the skin so badly that the skin dies and pus forms beneath. There is evidence that constant exposure to the sun can cause cancer (or melanoma) of white skin. Depletion of the ozone layer in the atmosphere may increase the incidence of skin cancer

sunrise *noun* time when the sun appears above the eastern horizon

◇ **sunset** *noun* time when the sun disappears below the western horizon

◇ **sunshine** *noun* bright light from the sun

◇ **sunspots** *noun* streams of gas shooting outwards from the sun

COMMENT: sunspots appear on the surface of the sun in an eleven year cycle. They seem to have an effect on the earth's climate, which tends to become more turbulent when the sunspots appear

super- *prefix* meaning (i) above; (ii) extremely

◇ **supercooled** *adjective* (fog) cooled below freezing point, but still remaining liquid

COMMENT: supercooled fog contributes to the phenomenon known as freezing fog, where droplets of fog remain liquid in the air, even though the temperature is below $0^\circ C$, but freeze into hoar frost as soon as they touch a surface

superficial *adjective* on the surface or close to the surface

superheated *adjective* (steam) heated to a high temperature in a power station

◇ **superheater** *noun* section of a power station boiler, where steam is heated to a higher temperature

COMMENT: steam made by heating water in a boiler is passed through the furnace a second time to heat it again. This superheated steam is produced under very high pressure to turn the first (or high-pressure) turbine in the generating plant

superinsulated *adjective* (house) with complete insulation

QUOTE by investing from two to seven thousand dollars to superinsulate a house, it is possible to reduce annual heating costs to between \$20 and \$300. The low heating bills result because superinsulated houses store the free heat from people, lighting, electrical appliances and passive solar heat from windows

Scientific American

superphosphate *noun* chemical compound formed from calcium phosphate (basic slag) and sulphuric acid, used as a fertilizer

supersaturated *adjective* (air) which contains more moisture than that required to saturate it; (solution) which contains more solute than that required to saturate it

supersonic *adjective* (aircraft) which flies at speeds faster than the speed of sound; **supersonic boom** = noise made by shock waves from an aircraft travelling at supersonic speeds

supra- *prefix* meaning above or over

surface *noun* top layer of something; **surface water** = water (after rain) which lies on the surface of the soil and does not drain into the soil, but flows across the surface as a stream and drains into rivers; **surface wind** = wind which blows across the land surface (as opposed to winds higher in the atmosphere)

surge *noun* sudden increase (as in demand for electricity or in electric current when lightning strikes a building); **electricity companies try to reduce the huge surges in demand that occur at certain times of the day**; **surge arrester** = device to prevent surges of current in an electric system, that can damage equipment

survive *verb* to continue to live; **they survived a night on the mountain without food**; **fish can survive for some time in frozen water**; **the plants survive even the hottest desert temperatures**

◇ **survival** *noun* continuing to live; **the survival rate of newborn babies has begun to fall**

◇ **survivor** *noun* person who survives

◇ **survivorship** *noun* proportion of individuals of a population surviving at a given time; **survivorship curve** = graph showing the numbers of individuals of a population which survive to a certain time

suspend *verb* to hold particles in a liquid or in air; **an aerosol of suspended particles**

◇ **suspension** *noun* liquid with solid particles in it, not settling to the bottom nor floating on the surface

sustain *verb* to keep or to support; **the land is fertile enough to sustain a wide variety of fauna and flora**

Sv *abbreviation* for sieve

swallow hole *noun* hole which forms in limestone rock as rainwater drains through it, dissolving minerals in the rock and sometimes forming underground caverns

swamp *noun* area of very wet land; **backswamps** = swampland away from a main watercourse; **mangrove swamp** = swamp covered with mangroves

◇ **swampland** *noun* area of land covered with swamp

◇ **swampy** *adjective* (land) which is waterlogged and supports a natural community of plants and animals

swarm 1 *noun* large number of insects (such as bees or locusts) travelling as a group **2 verb** (of insects) to travel as a large group

sweetener *noun* artificial substance (such as saccharin) added to food to make it sweet

swidden *noun* slash and burn, a form of agriculture where forest is cut down and burnt to create open space for growing crops; the space is abandoned after several crops have been grown and further forest is cut down

sycamore *noun* large hardwood tree of the maple family

symbiosis *noun* condition where two or more organisms exist together and help each other to survive

◇ **symbiont** *noun* one of the organisms living in symbiosis; *compare* COMMENSAL

◇ **symbiotic** *adjective* referring to symbiosis; living in symbiosis; **the rainforest has evolved symbiotic mechanisms to recycle minerals**

◇ **symbiotically** *adverb* in symbiosis; **colonies of shellfish and the parasites that live symbiotically with them**

QUOTE the mussel filters bacteria from water and also derives nutrition from its symbiotic bacteria

QUOTE like other animals that gain energy from symbionts, the hairy snails can store elemental sulphur

New Scientist

sympile *noun* social animal, animal (such as an ant or bee) which lives in an organized society

symptom *noun* change in the way the body works or change in the body's appearance, which shows that a disease or disorder is present

◇ **symptomatic** *adjective* which is a symptom

syn- *prefix* meaning joint or fused

syncline *noun* (in rock formations) concave downwards fold of rocks with the youngest rocks on the inside; *compare* ANTICLINE

syndrome *noun* group of symptoms and other changes in the body's functions which, when taken together, show that a particular disease is present

synecology *noun* study of communities of organisms in their environments; *compare* AUTECOLOGY

synergism *noun* phenomenon where two substances act more strongly together than they would if they were separate (as when mixtures of pollutants can be more toxic than each pollutant taken separately)

◇ **synergist** *noun* food additive which increases the effect of another additive

synroc *noun* artificial mineral compound, formed of nuclear waste fused into minerals which will never deteriorate

synthesis *noun* (i) process of combining things to form a whole; (ii) process of producing a compound by a chemical reaction

◇ **synthesize** *verb* to make a chemical compound from its separate components; *essential amino acids cannot be synthesized; the body cannot synthesize essential fatty acids and has to absorb them from food*

◇ **synthetic** *adjective* made by people or made artificially

◇ **synthetically** *adverb* made artificially; *synthetically produced hormones are used in hormone therapy*

synusia *noun* group of plants living in the same habitat

system *noun* (a) arrangement of things or phenomena which act together; **ecosystem** = grouping of living organisms and the environment in which they live; **frontal system** = series of warm or cold fronts linked together; **the solar system** = arrangement of planets orbiting around the sun (b) arrangement of certain parts of the body so that they work together; **the alimentary system** = system of organs and tracts which digest and break down food (including the alimentary canal, the salivary glands, the liver, etc.); **the cardiovascular system** = system of organs and blood vessels where the blood circulates round the body (including the heart, arteries and veins) (c) way of classifying something scientifically; **the Linnaean system** = method of naming organisms worked out by the Swedish scientist Carolus Linnaeus; *see also* LINNAEAN

◇ **systematic** *adjective* organized in a planned way; part of a system

◇ **systemic** *adjective* which affects the whole organism; **systemic fungicide** or **insecticide** = fungicide or insecticide which acts by entering the organism and killing it

Système International *see* SI

Tt

T *abbreviation for tera-*

Ta *chemical symbol for tantalum*

table *noun* level structure; **table mountain** = flat-topped mountain; **water table** = top level of water in the ground that occupies spaces in rock or soil and is above a layer of impermeable rock

taiga *noun* forested region between the Arctic tundra and the steppe

tailings *noun* refuse or waste ore from mining operations

◇ **tailpipe** *noun* US exhaust pipe, tube at the back of a motor vehicle through which gases produced by burning petrol are sent out into the atmosphere

tank *noun* large receptacle for liquid; *he stopped at the garage to fill his tank with petrol*; *mobile water tanks have been bringing water to drought-stricken areas*; **sedimentation tank** = tank in which sewage is allowed to stand so that solid particles can sink to the bottom

◇ **tanker** *noun* truck or large ship for carrying petrol or oil

tantalum *noun* rare metal which does not corrode, used to repair damaged bones

NOTE: chemical symbol is **Ta**; atomic number is 73

tap 1 *noun* pipe with a handle which can be turned to make a liquid or gas come out of a container **2** *verb* to remove or drain liquid from something; **to tap oil resources** = to bring up oil from the ground; *see also* UNTAPPED

◇ **tap root** *noun* thick main root of a plant which grows straight down into the soil; *the taproot system has a main root with smaller roots branching off it, as opposed to a fibrous root system which has no main root*

◇ **tapwater** *noun* mains water which is available in a house; *tapwater often smells of chlorine*

tar *noun* thick black substance derived from coal; **coal tar** = any of several liquids, formed by distillation of coal, used in the pharmaceutical industry and as a wood preservative; **tar pit** = natural hole in the earth containing bitumen; **tar sands** = oil sands, any

porous layer of sand containing oil (found especially in Canada and the USSR)

tarn *noun* lake in a depression high in the hills in the English Lake District

tartrazine *noun* yellow substance (E102) added to food to give it an attractive colour (although widely used, tartrazine provokes reactions in hypersensitive people and is banned in some countries)

taungya *noun* tropical agricultural system where arable farming and forestry are practised together

-taxis *suffix* referring to the response of an organism which moves towards or away from a stimulus

taxon *noun* any grouping of a scientific classification of organisms (family, genus, species, etc.)

◇ **taxonomy** *noun* way of classification of organisms

◇ **taxonomic** or **taxonomical** *adjective* referring to taxonomy; *a taxonomical group or unit*

TBT *an antifouling paint*

TCDD

= TETRACHLORODIBENZOPARADIOXIN
highly toxic environmentally persistent by-product of 2,4,5-T

teak *noun* tropical hardwood which is resistant to water

technique *noun* way of doing scientific or medical work; *a new technique for dating fossils*

◇ **technician** *noun* person who does practical work in a laboratory or scientific institution; *he is a laboratory technician in a laboratory attached to the research institute*

technology *noun* applying scientific knowledge to industrial processes; *the technology has to be related to user requirements*; **alternative technology** = using methods to produce energy which are different and less polluting than the usual ways (i.e. wind power, tidal power, solar

power, as opposed to traditional or nuclear power stations); **appropriate technology** = technology that is suitable for the local environment, usually involving skills or materials that are easily available locally; **intermediate technology** = technology that is half way between the advanced technology of developed countries and the lack of technology in underdeveloped countries; **new technology** = electronic instrument and devices which have recently been developed and are being introduced into industry

◇ **technological adjective** referring to technology; **technological fix** = solution to a problem based on using technology, generally not a really satisfactory solution; **technological revolution** = changing of industrial methods by introducing new technology

◇ **technosphere noun** the environment build or modified by humans

QUOTE technologies such as improved stoves, locally-designed water pumps and other applications that fall under the category of appropriate technology do not qualify for patents

Appropriate Technology

tectonic 1 adjective referring to faults or movements in the earth's crust **2 noun plate tectonics** = theory that the earth's surface is made up of a series of large plates of solid rock which move very slowly, and where they meet cause earthquakes and volcanic eruptions

temperate adjective neither very hot nor very cold; **temperate climate or temperate region** = climate or region which is neither very hot in summer nor very cold in winter; **temperate forest** = forest in a temperate region

temperature noun measurement of heat in degrees; **temperature coefficient** = ratio of the speed at which a process develops compared to the speed of the same process at 10°C cooler temperature; **temperature inversion** = atmospheric phenomenon where cold air is nearer the ground than warm air, making the temperature of the air rises as one gets further from the ground; **temperature lapse rate** = rate at which the temperature of the air falls with altitude; **critical temperature** = temperature below which a gas will normally become liquid; **global temperature** = temperature over the earth as a whole; **mean temperature** = average temperature; **the mean temperature for July is 25°C**

temporary adjective which is not permanent or which does not last a long time; **temporary hardness** = hardness of water caused by carbonates of calcium, which can be removed by boiling the water

tender adjective (plant) which cannot stand frost

tendon noun strip of connective tissue which attaches a muscle to a bone; **tendon sheath** = tube of membrane which covers and protects a membrane

tendrill noun part of a climbing plant which clings to a surface, so allowing the plant to climb

tera- prefix meaning one billion (10^{12}); **teragram** = one billion grams

teratogen noun substance which causes birth defects

terawatt (TW) noun unit of measurement of electric energy, equal to one billion watts

terminal adjective referring to the end; which comes at the end; **terminal moraine** = heap of soil and sand pushed by a glacier and left behind when the glacier melts

termite noun insect which looks like a large ant, which lives in colonies and eats cellulose

◇ **termitarium or termite's nest noun** nest of termites, formed in the shape of a hill of hard earth

tern noun species of small gull

terrace 1 noun flat strip of land across a sloping hillside, lying level along the contours; **river terrace** = flat plain made by a river **2 verb** to build terraces on a mountainside; **the hills are covered with terraced rice fields**

COMMENT: terracing is widely used to create small flat fields on steeply sloping land, so as to bring more land into productive use, and also to prevent soil erosion

terrain noun type of land surface (referring to travelling or cultivating); **buffalo are useful for cultivating land on difficult terrains**

terrestrial adjective referring to land or to the planet earth; **terrestrial animals** = animals which live on dry land; **terrestrial equator** = imaginary line running round the earth, at an equal distance from the North and South Poles; **terrestrial magnetism** = magnetic properties of the earth

terricolous adjective (animal) which lives in soil

territory noun area of land occupied and defended by an animal (it may be all or part of the animal's home range); **a robin will defend its territory by attacking other robins that enter it**

◇ **territorial adjective** referring to territory; **territorial species** = species which occupies and defends an area of land

◇ **territorialism or territoriality noun** phenomenon of having territories

QUOTE in theory the size of a territory defended by a bird varies according to the abundance of food within the territory

Natural History

tertiary adjective third, coming after secondary and primary; **tertiary consumer** = carnivore which only eats other carnivores; **tertiary industry** = industry which does not produce or manufacture, but which offers a service (such as banking, tourism, etc.); the **Tertiary Period** = the geological period which lasted from about 65 million years ago to 2 million

test 1 noun short examination to see if a sample is healthy or if something is working well; **laboratory tests showed that the sample was positive**; **government officials have carried out tests on samples of drinking water**; **the committee has called for a ban on tests of nuclear weapons**; **blood test** = test of a blood sample to find the chemical composition of a patient's blood; **nuclear test ban** = ban on testing of nuclear weapons **2 verb** to examine a sample to see if it is healthy or a device to see if it is working well; **they sent the water sample away for testing**; **the government has resumed the programme of nuclear testing**; **nuclear testing site** = place where nuclear tests are carried out

◇ **test tube noun** small glass tube with a rounded bottom, used in laboratories to hold samples of liquids

tetanus noun infection caused by *Clostridium tetani* in the soil, which affects the spinal cord and causes spasms which occur first in the jaw (also called lockjaw)

COMMENT: people who work on the land or with soil (such as farm workers or construction workers) should be immunized against tetanus

tetrachlorodibenzoparadioxin noun dangerous gas made as a by-product of the manufacture of 2,4,5-T (this was the gas which escaped during the Seveso disaster in 1976)

tetraethyl or tetramethyl noun lead tetraethyl = additive added to petrol to prevent knocking

COMMENT: adding these lead compounds to petrol has the effect of releasing lead into the atmosphere as the petrol is burnt in the engine. Unleaded petrol is less polluting

texture noun roughness or smoothness of a surface or of a substance; **fine texture** = substance with a smooth surface or with very small particles; **coarse texture or rough texture** = substance with a rough surface or with large particles; **soil texture** = description of the type of particles that make up a specimen of soil

Th chemical symbol for thorium

thallium noun metallic element, which is poisonous and used in pesticides

NOTE: chemical symbol is **Tl**; atomic number is **81**

thatch verb to cover a roof with reeds or straw; **reeds provide the best material for thatching**

thaw 1 noun period when the weather becomes warmer after a heavy frost **2 verb** to bring something which is frozen back to normal temperature; **it is possible that rising atmospheric temperatures will make the polar ice caps thaw and raise the level of the sea**

theodolite noun instrument used by surveyors for measuring angles (formed of a telescope mounted in such a way that it can rotate)

thermal 1 adjective referring to heat; **thermal efficiency** = ability of a process to heat efficiently; **thermal pollution** = change in the quality of an environment by increasing its temperature (such as the heat from the cooling towers of a power station or from discharge of a coolant); **thermal radiation** = emission of radiant heat; **thermal reactor** = nuclear reactor which heats, using a moderator, as opposed to a breeder reactor; **thermal spring** = spring of hot water which comes out of the earth; **thermal stratification** = different layers of heat in a body of water **2 noun** current of rising hot air in the lower atmosphere

◇ **thermo- prefix** referring to (i) heat; (ii) temperature

◇ **thermocline noun** metalimnion, middle layer of water in a lake, between the epilimnion and the hypolimnion, in which heat decreases rapidly as the depth increases

◇ **thermograph noun** instrument which records changes in temperature on a roll of paper

◇ **thermolysis noun** reduction in body temperature (as by sweating)

◇ **thermometer noun** instrument for measuring heat; **maximum-minimum thermometer** = thermometer which shows the highest and lowest temperatures reached since it was last checked, as well as the current temperature

◇ **thermometry noun** science of measuring heat

◇ **thermonasty** *noun* response of plants to heat

◇ **thermonuclear energy** *noun* energy produced by fusion of nuclei; **thermonuclear reaction** = fusion of nuclei, which produces huge amounts of energy (used in the hydrogen bomb)

◇ **thermophilic** *adjective* (organism) which needs a high temperature to grow, such as the organisms which live in the hot water from thermal springs

◇ **thermoplastic** *adjective* (type of plastic) which can be recycled by heating and cooling

◇ **thermosetting** *adjective* (type of plastic) which is destroyed by heat and cannot be recycled

◇ **thermosphere** *noun* zone of the earth's atmosphere above 80km from the surface of the earth, where the temperature increases with the altitude

therophyte *noun* annual, a plant which grows from a seed in spring, flowers, sets seed and dies within one season, leaving the seed to remain dormant in the soil during the winter

thiamin(e) or Vitamin B1 *noun* vitamin found in yeast, cereals, liver and pork (lack of thiamine causes beriberi)

30 per cent club *noun* group of nations who signed a UN agreement to reduce by 1993 emissions of sulphur by 30% as compared to the levels in 1980

THM = TRIHALOMETHANE

thorax or chest *noun* (in insects) middle section of the body, between the head and the abdomen; (in animals) cavity in the top part of the body above the abdomen, containing the diaphragm, heart and lungs, all surrounded by the rib cage

thorium *noun* natural radioactive element which decomposes to radioactive radon gas
NOTE: chemical symbol is **Th**; atomic number is 90

threadworm or pinworm *noun* thin parasitic worm *Enterobius* which infests the large intestine

threat *noun* something dangerous which may harm; *lead pollution is a threat to small babies*

◇ **threaten** *verb* to show that harm will come; *plant species growing in arid or semi-arid lands are threatened by the expansion of livestock herding; the plan for the motorway threatens to damage the ecology of the wood; threatened species* = species which is not in as much danger of extinction as an endangered species, but which needs protection

Three Mile Island nuclear power station in Pennsylvania, USA, where an accident in 1979 almost caused the release of large quantities of radioactive substances

threonine *noun* essential amino acid

threshold *noun* (i) point below which the environment is not harmed by something; (ii) point below which a drug has no effect; (iii) point at which something is strong enough to be sensed by an instrument or by a sensory nerve; **audibility threshold** = level of sound which a person can just hear; *she has a low hearing threshold*; **critical threshold** = point below which something will no longer take place (especially, point at which a species is likely to become extinct); *the population will rapidly reach a critical threshold if steps are not taken to protect it from extinction*; **pain threshold** = point at which a person cannot bear pain without crying

thrive *verb* to do well or to live and grow strongly; *these plants thrive in very cold environments*

throw *noun* amount of movement up or down of rocks at a fault line

thrust *noun* force in the crust of the earth which squeezes and so produces fold; **thrust fault** = low angle reverse fault

thunder *noun* loud sound generated by lightning in the atmosphere; *the storm was accompanied by thunder and lightning*

◇ **thunderstorm** *noun* storm with rain, thunder and lightning

COMMENT: the distance of a storm from the person hearing the thunder can be calculated by counting the number of seconds between the lightning flash and the sound of the thunder. Divide this figure by three and you have the distance in kilometres to the centre of the storm

thyroid 1 *adjective* referring to the thyroid gland; **thyroid hormone** = hormone produced by the thyroid gland **2 noun** **thyroid (gland)** = endocrine gland in the neck below the larynx

COMMENT: the thyroid gland is activated by the pituitary gland, and produces thyroxine, a hormone which regulates the body's metabolism. The thyroid gland needs a supply of iodine in order to produce thyroxine

◇ **thyroxine** *noun* hormone produced by the thyroid gland which regulates the body's metabolism and conversion of food into heat

Ti chemical symbol for titanium

tick *noun* tiny parasite of the order Acarida, which sucks blood from the skin; **tick fever** = infectious disease transmitted by bites from ticks

tide *noun* regular rising and falling of the sea, in a twice-daily rhythm; **high tide** or **low tide** = points when the level of the sea is at its highest or lowest; **neap tides** = tides which occur each month at the first and third quarters of the moon, when the difference between the high and low tides is least; **spring tides** = tides which occur each month at the new and full moon, when the high and low tides are high and lower than at other times; **red tide** = phenomenon where the sea becomes red, a bloom caused by millions of microscopic organisms

◇ **tidal** *adjective* referring to the tide; **tidal energy** or **tidal power** = energy obtained from the movement of the tides; **tidal wave** = tsunami, wave caused by an earthquake under the sea, which moves rapidly across the surface of the sea and becomes very large when it hits the shore (note that it has nothing to do with the tide)

COMMENT: the tides are caused by the gravitational pull of the moon, taken together with the centrifugal force of the earth as it rotates, which make the water on the surface of the earth move to high peaks at opposite sides of the earth and low troughs half way between. Twice each month, at the new and full moon, the sun, moon and the earth are directly aligned, giving the highest gravitational pull and causing the spring tides

tilapia *noun* tropical white fish, very suitable for growing in fish farms

till 1 *noun* boulder clay, clay soil mixed with rocks of different sizes, found in glacial deposits 2 *verb* to plough or to dig or to harrow the soil, to make it ready for the cultivation of crops

◇ **tillage** *noun* husbandry or action of tilling the soil

tilth *noun* good light crumbling soil, suitable for growing plants; tilled soil; *work the soil into a fine tilth before sowing seeds*

timber *noun* trees which have been felled and cut into logs

◇ **timberline** *noun* line across the side of a mountain marking the highest point at which trees will grow; *the slopes above the timberline were covered with boulders, rocks and pebbles*

tin *noun* metallic element, used especially to form alloys

NOTE: chemical symbol is **Sn**; atomic number is 50

tip 1 *noun* place where rubbish is thrown away; *the sifting of the council refuse tip has caused a lot of controversy* 2 *verb* to throw away rubbish; **controlled tipping** = disposal of waste in special landfill sites, as opposed to throwing it away anywhere (NOTE: US English is **sanitary landfill**) *see also* FLY-TIPPING

tissue *noun* material made of cells, of which the parts of an animal's or plant's body are formed; *most of an animal's body is made up of soft tissue, with the exception of the bones and cartilage*; **adipose tissue** = tissue where the cells contain fat; **connective tissue** = tissue which forms the main part of bones and cartilage, ligaments and tendons, in which a large amount of fibrous material surrounds the tissue cells; **tissue culture** = live tissue grown in a culture in a laboratory

titanium *noun* light metallic element which does not corrode, used in aircraft manufacture NOTE: chemical symbol is **Ti**; atomic number is 22

titration *noun* process of measuring the strength of a solution

◇ **titre** *noun* measurement of the strength of a solution

Tl *symbol* for thallium

toadstool *noun* general name for a poisonous fungus which looks like a mushroom

tobacco *noun* leaves of a plant which are dried and smoked, either in a pipe or as cigarettes or cigars

COMMENT: tobacco contains nicotine, which is an addictive stimulant. This is why it is difficult for a person who smokes a lot of cigarettes to give up the habit. Nicotine can enter the bloodstream and cause poisoning; tobacco smoking also causes cancer, especially of the lungs and throat

tolerance *noun* ability of the body to tolerate a substance; *he has been taking the drug for so long that he has developed a tolerance to it*; **tolerance dose** = amount of radiation which can be given without harm in radiotherapy; **drug tolerance** = condition where a drug has been given to a patient for so long that his body no longer reacts to it, and the dosage has to be increased

◇ **tolerant** *adjective* which does not react to something

◇ **-tolerant** *suffix* meaning which tolerates; *a salt-tolerant plant*

◇ **tolerate** *verb* to accept or not to react to (something)

◇ **toleration** *noun* not reacting to something; **toleration level** = level at which an organism will tolerate something; *waste hot water from power stations can kill freshwater fish by raising the water temperature above toleration levels*

ton *noun* measure of weight; *GB long ton* = measure of weight (= 1016 kilos); *US short ton* = measure of weight (= 907 kilos); *metric ton* = 1,000 kilos

◇ **tonne** *noun* metric ton or 1,000 kilos

QUOTE at present there are millions of tonnes of fly-tipped material which local authorities cannot afford to have removed
London Environment Alert!

toothed *adjective* (animal) with teeth; **toothed whales** = *Odontoceti*, whales, including sperm whales, killer whales, porpoises and dolphins, which have teeth

topical *adjective* referring to one particular part of the body; **topical drug** = drug which is applied to one part of the body only

◇ **topically** *adverb* (applied) to one part of the body only; *the drug is applied topically*

topography *noun* study of the physical features of a geographical area

◇ **topographical** *adjective* referring to topography

◇ **topotype** *noun* population which has become different from other populations of a species because of adaptation to local geographical features

topsoil *noun* top layer of soil, often containing organic material, disturbed in farming, from which chemical substances are leached into the subsoil below

tornado *noun* whirlwind

COMMENT: tornadoes are formed by rising air currents associated with large cumulonimbus clouds. They rotate anticlockwise in the Northern Hemisphere and clockwise in the Southern. A tornado is formed of a rapidly turning column of air. Passing over the sea they pick up water and become waterspouts

total *adjective* complete or covering everything; *the total world population of the animal is no more than four or five hundred pairs*; **total eclipse** = eclipse when the whole of the sun or moon is hidden

tox- or **toxo-** *prefix* meaning poison

◇ **toxic** *adjective* poisonous or harmful; **toxic agent** = substance which is harmful; **toxic substances** = substances, such as lead, which are harmful to living organisms; **toxic waste** = waste which is poisonous

◇ **toxicity** *noun* level to which a substance is poisonous or amount of poisonous material in a substance; *scientists are measuring the toxicity of car exhaust fumes*; *certain gases are dangerous because of their toxicity to humans*; **acute toxicity** = level of concentration of a toxic substance, which makes people seriously ill, or can even cause death; **chronic toxicity** = exposure to harmful levels of a toxic substance over a long period of time

◇ **toxico-** *prefix* meaning poison

◇ **toxicological** *adjective* referring to toxicology; *irradiated food presents no toxicological hazard to humans*

◇ **toxicologist** *noun* scientist who specializes in the study of poisons

◇ **toxicology** *noun* scientific study of poisons and their effects on the human body

◇ **toxicosis** *noun* poisoning

◇ **toxin** *noun* poisonous substance from a plant or animal

◇ **toxoid** *noun* toxin which has been treated and is no longer poisonous, but which can still provoke the formation of antibodies

COMMENT: toxoids are used as vaccines, and are injected into a patient to give immunity against a disease

t/pa = TONNES PER ANNUM

TPO = TREE PRESERVATION ORDER

trace *noun* (a) very small amount; *there are traces of radioactivity in the blood sample*; **trace gases** = gases (such as xenon or helium) which exist in the atmosphere in very small quantities; **trace element** = element which is essential to organic growth, but only in very small quantities

COMMENT: plants require traces of iron, manganese, copper, zinc; human beings require the trace elements cobalt, chromium, copper, magnesium, manganese, molybdenum, selenium and zinc

◇ **tracer** *noun* foreign substance, usually radioactive, that can be attached to material so that the course of that material (for example, round the body) can be traced

tract *noun* (a) internal organ; *the digestive tract* = passage from the mouth through the throat, the stomach and intestines (b) large area (especially of land); *large tracts of forest have been destroyed by fire*

trade winds *noun* winds which blow from the east in the tropics; **trade cumulus** = cumulus clouds usually associated with the trade winds

traditional *adjective* which has always been done in the same way; *traditional technologies*

exist which meet basic subsistence needs; the traditional system of agriculture has been revolutionized by the application of modern technology

trait *noun* characteristic which is particular to an organism

trans- *prefix* meaning through or across

◇ **transfer** 1 *noun* passing from one place to another; **technology transfer** = passing technology from a developed country to an underdeveloped one 2 *verb* to pass from one place to another

QUOTE we have warned against making the assumption that technology can be transferred from one country to another without testing and adaptation

Appropriate Technology

transition *noun* change from one state to another; **demographic transition** = pattern of change of population growth from high birth and death rates to low birth and death rates

translocate *verb* to move substances through the tissues of a plant; **translocated herbicides** = herbicides which kill a plant after being absorbed through its leaves

◇ **translocation** *noun* movement of substances through the tissues of a plant

transpire *verb* (of plants) to lose water through stomata; *in tropical rainforests, up to 75% of rainfall will evaporate and transpire into the atmosphere*

◇ **transpiration** *noun* loss of water from a plant through its stomata

COMMENT: transpiration accounts for a large amount of water vapour in the atmosphere. A tropical rainforest will transpire more water per square kilometre than is evaporated from the same area of sea. Clearance of forest has the effect of reducing transpiration, with the accompanying change in climate: less rain, leading to eventual desertification

transplant *verb* (a) to take a growing plant from one place and plant it in the soil in another place (b) to graft an organ or tissue onto a person

transuranic elements *noun* artificial radioactive elements which are beyond uranium in the periodic table

COMMENT: the transuranic elements have higher atomic numbers than uranium (atomic number 92), and apart from neptunium and plutonium, do not occur naturally but are formed from uranium in nuclear reactions (such as Americium, atomic number 95)

trash *noun* US waste

◇ **trashcan** *noun* US container into which household rubbish is placed before collection by the municipal refuse collectors

NOTE: the British English is **dustbin**

treat *verb* to process sewage

◇ **treatment** *noun* way of processing sewage; **sewage treatment plant** = plant where sewage from houses and other buildings is brought and treated

tree *noun* very large plant with a wooden stem; *ecologists are worried that the cutting of forest trees in many parts of the world will bring about desertification and change global climate patterns; tree ring records from high altitudes show sharply reduced annual growth; tree ferns* = very large ferns found in Australasia, growing like trees with a single large stem

◇ **treeline** *noun* (i) line at a certain altitude, above which trees will not grow; (ii) line in the Northern or Southern hemisphere, north or south of which trees will not grow

tremor *noun* slight movement; **earth tremor** = slight earthquake

trench *noun* (a) long narrow hole in the ground; **drainage trench** = long hole cut in the ground to allow water to run away (b) **oceanic trench** = long deep valley in the floor of the ocean, where two tectonic plates meet, usually associated with volcanic activity

trend *noun* gradual development; *there is a trend towards organic farming and away from using chemical fertilizers*

QUOTE computers enable ecologists to study their recorded observations and indicate links between data showing trends which can be statistically explained

Environment Now

trichlorophenoxyacetic acid *noun* 2,4,5-T, herbicide which forms dioxin as a by-product during manufacture

trickling filter *noun* filter bed through which liquid sewage is passed to purify it

trigger *verb* to start something happening; *it is not known what triggered the avalanche, the plague of locusts was triggered by unusually warm weather*

trioxide *noun* any oxide containing three oxygen atoms per molecule; **sulphur trioxide** = gas formed when fuels are burnt, and which is usually present in sulphur oxide pollution

tritium *noun* rare isotope of hydrogen

trivial *adjective* not important

QUOTE the radioactivity in the waste will become trivial after hundreds of years

New Scientist

troph(o)- *prefix* referring to food or nutrition

◇ **trophic** *adjective* referring to nutrition; **trophic level** = one of the levels in a food chain; **trophic structure** = structure of an ecosystem, shown by food chains and food webs; see also DYSTROPHIC, EUTROPHIC, MESOTROPHIC, OLIGOTROPHIC

COMMENT: the three trophic levels are: producers (organisms, such as plants, which take energy from the sun or the environment and convert it into matter); primary consumers (organisms, such as herbivores, which eat producers); secondary consumers (organisms, such as carnivores, which eat other consumers)

-**trophy** *suffix* meaning (i) nourishment; (ii) development of an organ

-**tropic** *suffix* meaning (i) turning towards; (ii) which influences

tropic *noun* Tropic of Cancer = parallel running round the earth at latitude 23° 28'N; Tropic of Capricorn = parallel running round the earth at latitude 23° 28'S; **tropics** = tropical countries or hot areas of the world or regions between the Tropic of Cancer or Tropic of Capricorn and the equator; he lives in the tropics; disease which is endemic in the tropics

◇ **tropical** *adjective* referring to the tropics; the disease is carried by a tropical insect; **tropical disease** = disease which is found in tropical countries, such as malaria, dengue, Lassa fever; **tropical medicine** = branch of medicine which deals with tropical diseases; **tropical rainforest** = biome where almost constant rain and high temperature permit plants to grow throughout the year; **tropical storm** = violent storm occurring in the tropics; see also CYCLONE, HURRICANE, TYPHOON

-**tropism** *suffix* meaning the action of turning towards a stimulus; **phototropism** = turning towards the light

NOTE: opposed to -**nasty** which refers to a response without turning

tropopause *noun* layer in the atmosphere between the troposphere and the stratosphere

troposphere *noun* lower layer of the atmosphere immediately above the ground, rising to about 18 km above the earth's surface at the equator and 8 km at the North and South Poles

◇ **tropospheric** *adjective* referring to the troposphere

COMMENT: the troposphere is formed largely of nitrogen (78%) and oxygen (21%), plus argon and some trace gases. The temperature in the troposphere falls about 6.5° per thousand metres of altitude; the temperature at 16 km being about minus 55°C. The troposphere contains almost all the atmosphere's water vapour

trough *noun* (a) low point; the graph shows the peaks and troughs of pollution over the seasons (b) long narrow area of low pressure, leading away from the centre of a depression

NOTE: the opposite is **ridge**

true *adjective* correct; to breed true = to reproduce all the characteristics of the species; F₁ hybrids do not breed true

trunk *noun* (a) main part of a tree (b) trunk sewer = main sewer pipe into which smaller sewers flow

trypanosome *noun* parasite which causes sleeping sickness, transmitted by the tsetse fly

tryptophan *noun* essential amino acid

tsetse fly *noun* African insect which passes trypanosomes into the bloodstream of humans and other animals, causing sleeping sickness

tsunami *noun* tidal wave, wave caused by an earthquake under the sea, which moves rapidly across the surface of the sea and becomes very large when it hits the shore

NOTE: although commonly called a tidal wave, in fact it has no connection with the tides

tsutsugamushi disease *noun* scrub typhus, a form of typhus found in South-East Asia, caused by the Rickettsia bacterium and transmitted to humans by mites

tuber *noun* fat part of an underground stem or root, which holds nutrients, and which has buds from which shoots develop; a potato is the tuber of a potato plant

◇ **tuberous** *adjective* (i) like a tuber; (ii) (plant) which grows from a tuber

tufa *noun* form of calcareous deposit found near hot springs

tundra *noun* cold treeless arctic and alpine region which may be covered with low shrubs, grasses, mosses and lichens

turbid *adjective* (liquid) which is cloudy because of particles suspended in it

◇ **turbidity** *noun* (of liquid) being cloudy

turbine *noun* mechanical device which converts moving liquid or steam or air into energy, by turning a generator; **gas turbine** = turbine driven by gas used in aircraft engines; **steam turbine** = turbine driven by steam

COMMENT: water turbines create electricity from water power. Water is channelled from a reservoir through pipes which turn the vanes of the turbine, which then turns the rotor of the generator. The main types of water turbine are: axial-flow turbine, with blades like those on a ship's propeller, rotating horizontally; the impulse turbine, where jets of water are directed at bucket-shaped blades which catch the water; reaction turbine, where the blades on the turbine adjust to the angle at which the jets of water hit them. Pumped storage turbines act as generators when water pressure is high, but become water pumps when pressure is low, pumping water back into the reservoir

turbulence *noun* rushing or uneven movement of air currents

◇ **turbulent** *adjective* rushing or uneven (air current)

TVP = TEXTURED VEGETABLE PROTEIN

twin *noun* one of two babies born to a mother at the same time; see also DIZYGOTIC, MONOZYGOTIC

twister *noun* US (informal) whirlwind or tornado

twitcher *noun* informal birdwatcher who will travel anywhere to see a rare bird

2,4,5-T *noun* trichlorophenoxyacetic acid, a herbicide, which forms dioxin as a by-product during the manufacturing process (this was the gas which escaped during the Seveso disaster in 1976)

typhoid fever *noun* infection of the intestine caused by *Salmonella* in food or water, which causes fever and diarrhoea, and may be fatal

typhoon *noun* name for a tropical cyclone in the Far East

typhus *noun* one of several fevers caused by the Rickettsia bacterium, making the patient very weak; see also SCRUB TYPHUS

tyramine *noun* enzyme found in cheese, beans, tinned fish, red wine and yeast extract, which can cause high blood pressure if found in excessive quantities in the brain

tyrosine *noun* amino acid in protein which is a component of thyroxine

Uu

U symbol for uranium

UKAEA = UNITED KINGDOM ATOMIC ENERGY AUTHORITY

ultra- prefix meaning (i) further than; (ii) extremely

◇ **ultrabasic** adjective (rocks) which have less silica and more magnesium than basic rocks

◇ **ultramicroscopic** adjective so small that it cannot be seen using a normal microscope

◇ **ultrasonic** adjective referring to ultrasound

◇ **ultrasonics** noun study of ultrasound

◇ **ultrasound** or **ultrasonic waves** noun very high frequency sound waves; *the nature of the tissue may be made clear on ultrasound examination*

COMMENT: the very high frequency waves of ultrasound can be used to detect objects. Bats and dolphins use ultrasonic waves to find their way, and ultrasound can be used in medicine to locate and record organs or growths inside the body (in a similar way to the use of X-rays), by recording the differences in echoes sent back from different tissues

ultraviolet rays (UV rays) noun invisible rays which have very short wavelengths and are beyond the violet end of the spectrum, forming the tanning and burning element in sunlight; **ultraviolet lamp** = lamp which gives off ultraviolet rays which tan the skin, help the skin produce Vitamin D and kill bacteria

COMMENT: UV rays form part of the high-energy radiation which the earth receives from the sun. UV rays are classified as UVA and UVB rays. UVB rays form only a small part of radiation from the sun, but they are dangerous and can cause skin cancer if a person is exposed to them for long periods. The effect of UVB rays is reduced by the ozone layer in the stratosphere

un- prefix meaning reversing an action or state

◇ **unblock** verb to remove something which is blocking

◇ **unboiled** adjective which has not been boiled; *in some areas, it is dangerous to drink unboiled water*

◇ **uncontaminated** adjective which has not been contaminated

◇ **uncontrollable** adjective which cannot be controlled

◇ **uncontrolled** adjective which is not controlled

◇ **uncoordinated** adjective not joined together or not working together

◇ **uncultivated** adjective (land) which is not cultivated

under- prefix meaning less than or not as strong as; **undernourished** = having too little food; **underproduction** = producing less than normal

◇ **underdeveloped countries** noun countries which have not been industrialized

underground adjective & adverb beneath the surface of the ground; *worms live all their life underground; foxes live in underground holes; an underground nuclear test was carried out at the desert test site; if power cables were placed underground, they would be less of an eyesore*

undergrowth noun shrubs and other plants growing under large trees

undershot wheel noun type of waterwheel, where the wheel rests in the flow of water which passes underneath it and makes it turn (this is not as efficient as the overshot wheel)

understorey noun lowest layer of trees and shrubs in a forest; *compare* CANOPY

QUOTE beech is mainly in the South Island.

It is a fairly open forest, though its understorey is often a complex association of young beech, ferns, shrubs and smaller tree species

Ecologist

underwood noun shrubs and bushes in a wood under the canopy

Ungulata or **ungulates** noun grazing animals which have hoofs, such as cattle

uni- prefix meaning one

◇ **unicellular** adjective (organism) formed one cell

unit noun (i) single part (as of a set; numbers); (ii) basic standard of measure

SI units = international system of measurement for physical properties; **lumen** is the SI unit of light per second

unleaded petrol *noun* petrol with a low octane rating, which has no lead additives (such as lead tetraethyl) and therefore creates less lead pollution in the atmosphere

unlined *adjective* (landfill site) with no lining, so that waste liquids can seep out into the surrounding soil

unneutralized *adjective* which is not made neutral

◇ **unpasteurized** *adjective* which has not been pasteurized; *unpasteurized milk can carry bacilli*

◇ **unpolluted** *adjective* which has not been polluted; *unpolluted atmosphere in the mountain areas*

◇ **unsaturated fat** *noun* fat which does not have a large amount of hydrogen, and so can be broken down more easily; *see also FAT, SATURATED*

◇ **unsettled** *adjective* (weather) which changes frequently from rainy to fine and back again

◇ **unsightly** *adjective* not pleasant to look at; *the company is proposing to run a line of unsightly pylons across the moors*

◇ **unspoilt** *adjective* (landscape) which has not been ruined by development; *the highland region is still unspoilt; the conservancy council is hoping to preserve the area of unspoilt woodland*

◇ **unstable** *adjective* not stable or which may change easily

◇ **unsterilized** *adjective* which has not been sterilized; *the milk was sold in unsterilized bottles*

◇ **untapped** *adjective* which has not yet been tapped; *untapped mineral resources*

◇ **untreated** *adjective* which has not been treated; *untreated sewage leaked into the river*

updraught *noun* rising air current (usually of warm air)

upfreezing *noun* US phenomenon where loose rocks rise to the surface of the soil in spring, caused by the freezing of the soil in winter

upland *noun* high areas of land; *upland areas or uplands have different ecosystems from the lowlands* NOTE: opposite is **lowland**

QUOTE fallout from the Chernobyl accident contaminated upland areas with radioactive caesium

New Scientist

upstream *adjective & adverb* towards the source of a river; *the river is contaminated for several miles upstream from the estuary; pollution has spread into the lake upstream of the waterfall*

uranium *noun* natural radioactive metallic element, which is an essential fuel for nuclear power

NOTE: the chemical symbol is **U**; atomic number is **92**

COMMENT: three uranium isotopes are found in ores: uranium-234, uranium-235 and uranium-238. Of these, U-235 is the only fissionable isotope occurring in nature, and so is an essential fuel for reactors

urban *adjective* referring to towns; **urban decay** = condition where part of a town becomes old or dirty or ruined, because businesses and wealthy families have moved away from it; **urban fringe** = land at the edge of built-up areas; **urban redevelopment** or **urban renewal** = rebuilding old parts of a town to create new houses, new shops, offices and factories; **urban sprawl** = mass of houses built without any particular plan, to meet the needs of an increasing population

◇ **urbanization** *noun* movement of people from the rural to urban settlements, from small settlements to larger ones, from cities into suburbs with encroachment on the countryside

urea *noun* substance produced in the liver from excess amino acids, and excreted by the kidneys into the urine

uric acid *noun* chemical compound which is formed from nitrogen in waste products from an animal's body

urine *noun* liquids containing uric acid, secreted as waste from an animal's body

utility *noun* company that organizes an essential public service, such as providing gas, or electricity or public transport

UV = ULTRAVIOLET

Vv

vaccinate *verb* to use a vaccine to give a person immunization against a specific disease; *she was vaccinated against smallpox as a child* NOTE: you vaccinate someone **against** a disease

◇ **vaccination** *noun* action of vaccinating

◇ **vaccine** *noun* substance which contains the germs of a disease, used to inoculate or vaccinate; *the hospital is waiting for a new batch of vaccine to come from the laboratory; new vaccines are being developed all the time*

◇ **vaccinia** *noun* cowpox or infectious disease of cattle, used to prepare vaccine to vaccinate against smallpox NOTE: Originally the words **vaccine** and **vaccination** applied only to smallpox immunization, but they are now used for immunization against any disease

COMMENT: a vaccine contains antigens (the germs of the disease) sometimes alive and sometimes dead, and this is injected into the patient so that his body will develop immunity to the disease. The antigens provoke the body to produce antibodies, some of which remain in the bloodstream for a very long time and react against the same antigens if they enter the body naturally at a later date when the patient is exposed to the disease. Vaccination is mainly given against cholera, diphtheria, rabies, smallpox, tuberculosis, and typhoid

vadose *adjective* (area) which lies between the surface of the ground and the water table

vagrant *noun* bird which only visits a country occasionally

valley *noun* long low area, usually with a river at the bottom, between hills or mountains; *fog forms in the valleys at night*; **valley bog** = peat bog which forms in the damp bottom of a valley

value *noun* quantity shown as a number; **calorific value** = number of calories which a certain amount of a certain food contains; **energy value** = amount of energy produced by a certain amount of a certain food

vapour *noun* substance in the form of gas which can be liquefied by increasing pressure; **vapour concentration** = ratio of the mass of

water vapour in a given quantity of air to the amount of air

◇ **vaporize** *verb* to turn a liquid into a vapour (either by heating or by blowing it into the air in the form of particles)

◇ **vaporizer** *noun* device which warms a liquid to which medicinal oil has been added, so that it provides a vapour which a patient can inhale

variable 1 *adjective* which changes or which is not constant; *the weather forecast is for variable winds* 2 *noun* quantity or quality which changes

◇ **variant** *noun* specimen of a plant or animal which is different from the normal type

◇ **variation** *noun* change from one thing or level to another; *there is a noticeable variation in temperature in the desert regions; the chart shows the variations in atmospheric pressure over a period of six months*

variety *noun* type of organism, especially a cultivated plant

vector *noun* insect or animal which carries a disease or parasite and can pass it to other organisms; *the tsetse fly is a vector of sleeping sickness*

veer *verb* (of wind) to move from north to south in a clockwise direction

NOTE: the opposite is **back**

vegan *noun & adjective* strict vegetarian or (person) who eats only vegetables and fruit, and no animal products like milk, fish, eggs or meat

vegetable *noun* plant grown for food, not usually sweet; *green vegetables are a source of dietary fibre*; **vegetable oils** = oils obtained from plants and their seeds, which are low in saturated fats

◇ **vegetarian** *noun & adjective* (person) who does not eat meat; *he is on a vegetarian diet*

vegetation *noun* (i) plants in general; (ii) plants which are found in a particular area; *the vegetation was destroyed by fire; very little vegetation is found in the Arctic regions; he is studying the vegetation of the island*

◇ **vegetative** *adjective* referring to vegetation; *the loss of vegetative cover with the*

destruction of forest, increases the accumulation of carbon dioxide in the atmosphere; vegetative propagation or vegetative reproduction = reproduction of plants by taking cuttings or by grafting, not by seed

veil *noun* thin layer of cloud or mist

vein *noun* (a) layer of valuable mineral found in rock; *they have struck a vein of gold* (b) blood vessel which takes deoxygenated blood containing waste carbon dioxide from the tissues back to the heart (c) thin tube which forms part of the structure of a leaf

vent *noun* hole through which gases or lava escape from a volcano; **hydrothermal vents** = holes in the bottom of the sea where hot water and gas flow out of the earth's crust

ventilate *verb* to provide fresh air; *the mine is ventilated with air pumped down from the surface*

◇ **ventilation** *noun* allowing air to circulate

◇ **ventilator** *noun* device which circulates fresh air into a room or building

ventral *adjective* referring to (i) the abdomen; (ii) the underneath of a plant's or an animal's body; (iii) to the front of the human body; *the fish has two ventral fins*

NOTE: the opposite is **dorsal**

venturi effect *noun* rapid flow of a liquid or a gas as it passes through a narrower channel

vermiculite *noun* substance which is used in soilless gardening

COMMENT: vermiculite occurs naturally as a form of silica and is capable of retaining moisture. It is processed into small pieces and used instead of soil in horticulture

vermin *noun* organisms which are looked upon as pests by some people; *see also* PEST

vernacular *adjective & noun* (language) spoken in a certain area; **vernacular buildings** = buildings built in the local style, which is different from the style in other parts of the country; **vernacular materials** = building materials found in the local area

vernal *adjective* referring to the spring; **vernal equinox** = March 21st, the point at which the sun passes the celestial equator

◇ **vernalization** *noun* making a seed germinate early by refrigerating it for a time

vertebra *noun* one of the ring-shaped bones which link together to form the backbone
NOTE: plural is **vertebrae**

◇ **vertebral** *adjective* referring to the vertebrae

◇ **vertebrate** *adjective & noun* (animal) which has a backbone

NOTE: the opposite is **invertebrate**

vessel *noun* container, especially a container for nuclear fuel or radioactive waste; **pressure vessel** = container that houses the core, coolant and moderator in a nuclear reactor

vestigial *adjective* which exists in a rudimentary form; *some snakes still have vestigial legs*

vibrate *verb* to shake repeatedly; *the passing traffic makes the foundations of the bridge vibrate*

◇ **vibration** *noun* act of vibrating; *vibrations caused by aircraft can shatter windows; the vibrations from traffic have weakened the foundations of the house*

victim *noun* person who is injured or harmed in an accident

vigour *noun* strength; **hybrid vigour** = increase in size or rate of growth or fertility or resistance to disease found in offspring of a cross between two species

◇ **vigorous** *adjective* which grows strongly; *plants put out vigorous shoots in warm damp atmosphere*

virement *noun* transfer of money from one account to another or from one budget to another

virgin *adjective* untouched by humans or in its natural state; *virgin rainforest is being cleared at the rate of 1,000 hectares per month; virgin ore* = ore as it is extracted from the ground, before it has been processed

virus *noun* tiny cell composed largely of genetic material and protein, which can only develop in other cells and often destroys them; *scientists have isolated a new flu virus; shingles is caused by the same virus as chickenpox*

◇ **viral** *adjective* (disease) caused by a virus

COMMENT: many common diseases such as measles or the common cold are caused by viruses; viral diseases cannot be treated with antibiotics (which only destroy bacteria)

viscid *adjective* sticky or slow-moving (liquid)

◇ **viscosity** *noun* state of a liquid which moves slowly

◇ **viscous** *adjective* thick or slow-moving (liquid)

visible *adjective* which can be seen; *everywhere there were visible signs of the effects of acid rain*

◇ **visibility** *noun* ability to see objects at a distance; *in fog, the visibility is less than 1,000 metres*

visitor *noun* migrant bird which comes to a region regularly

vital *adjective* most important for life; *vital nutrients are leached from the topsoil; oxygen is vital to the human system; vital organs* = the most important organs in the body, without which a human being cannot live (such as the heart, lungs, brain); *vital statistics* = official statistics relating to the population of a place (such as the percentage of live births per thousand, the incidence of a certain disease, the numbers of births and deaths)

vitamin *noun* essential nutrient usually needed by animals in minute quantities for growth and health; *vitamin deficiency* = lack of necessary vitamins; *he is suffering from Vitamin A deficiency; Vitamin C deficiency causes scurvy*

viviparous *adjective* (animal) which bears live young (such as mammals, as opposed to birds and reptiles which lay eggs and are oviparous)

◇ **vivisection** *noun* dissecting a living animal as an experiment

volatile *adjective* (liquid) which turns into gas at normal room temperature; *volatile oils* = concentrated oils from plants used in cosmetics and as antiseptics

volcano *noun* mountain surrounding a hole in the earth's crust, formed of solidified molten rock sent up from the interior of the earth

◇ **volcanic** *adjective* referring to volcanoes; *volcanic activity* = phenomenon showing that

a volcano is not extinct (the eruption of a volcano or emitting of smoke); *volcanic ash* = ash and small pieces of lava which are thrown up by an erupting volcano; *volcanic dust* = fine ash sent out during a volcanic eruption; *volcanic rocks* = rocks which are formed from lava

COMMENT: volcanoes occur along faults in the earth's surface, and exist in well-known chains. Some are extinct, but others erupt relatively frequently. Some are always active, in that they emit sulphurous gases and smoke, without actually erupting. Volcanic eruptions are a major source of atmospheric pollution, in particular of sulphur dioxide. Very large eruptions (such as that of Tambora in Indonesia in 1815) cause a mass of dust to enter the atmosphere, which has a noticeable effect on the world's climate (the Tambora eruption caused the "year without a summer" in 1816)

volume *noun* (a) amount of space that a substance occupies (b) loudness of a sound

-vore or -vorous *suffix* meaning which eat; *carnivore* = animal which eats animals; *herbivorous* = which eats plants

vortex *noun* flow of a liquid in a whirlpool or of a gas in a whirlwind; *the most destructive winds are in the vortex, where the rotation of the whirlwind produces very high wind speeds* *circumpolar vortex or polar vortex* = circular movement of air around one of the poles

vulnerable *adjective* (species) which is likely to become endangered unless protective measures are taken

vulture *noun* large bird of prey which feeds on carrion

Ww

wader *noun* bird which walks in shallow water and feeds organisms or plants found in the water

wadi *noun* gully with a stream at the bottom, found in the desert regions of North Africa; *see also* ARROYO

Waldsterben *noun* (German word meaning "the dying of trees") forest dieback, a disease affecting pine trees, where the pine needles turn yellow

QUOTE since 1980, many forests in the eastern US and parts of Europe have suffered a loss of vitality - a loss that could not be linked to any of the familiar causes, such as insects, disease or direct poisoning by a specific air or water pollutant. The most dramatic reports have come from Germany, where scientists, stunned by the extent and speed of the decline, have called it Waldsterben

Scientific American

COMMENT: there are many different theories about the cause of forest dieback: sulphur dioxide, nitrogen oxides, ozone are all possible causes, as are acid rain or acidification of the soil which makes the trees weak, and prevents them taking up nutrients from the soil

Wallace's line *noun* line dividing the Australasian biogeographical region from the South-East Asian region

warble fly *noun* parasitic fly, whose larvae infest cattle

warfarin *noun* substance used to poison rats

warm 1 *adjective* quite hot or pleasantly hot; *these plants grow fast in the warm season*; **warm front** = movement of a warm air mass which pushes away a cold air mass and gives rain **2** *verb* to make something hotter; *the greenhouse effect has the result of warming the general atmospheric temperature*; *at the poles, warming would be two or three times the global average if the greenhouse effect makes the earth's temperature rise*; **global warming** = gradual rise in temperature over the whole of the earth's surface; **sudden warming** = rapid rise in the temperature of the stratosphere, which occurs at the beginning of spring

◇ **warm-blooded** *adjective* (animal, such as a mammal) which has warm blood, as opposed to reptiles or fish; *see also* HOMOIOOTHERM

wash out *verb* to remove (a mineral) by running water; *most minerals are washed out of the soil during heavy rains*

◇ **washout** *noun* process where raindrops form normally in the atmosphere, and collect pollutant particles as they fall; *compare* RAINOUT

waste 1 *adjective* useless or which has no use; *waste products are dumped in the sea*; *waste matter is excreted by the body in the faeces or urine*; **waste product** = substance which is not needed in a process **2** *noun* rubbish or materials which are not needed; **high-level waste** = waste from nuclear reactors that is hot, emits strong radiation and is very difficult to dispose of safely; **household waste** = rubbish from houses; **indeterminate waste** = waste from a nuclear reactor which is more radioactive than low-level waste, but not as dangerous as high-level waste; **industrial waste** = rubbish from industrial processes; **low-level waste** = waste that is only slightly radioactive, and does not cause disposal problems; **nuclear waste** = radioactive waste from a nuclear reactor (including spent rods, coolant); **pathological waste** = waste (such as waste from a hospital) which may contain pathogens and which could cause disease; **waste disposal** = getting rid of waste; **waste management** = action of controlling and processing waste **3** *verb* to use more than is needed

◇ **wastage** *noun* act of wasting; *there is an enormous wastage of mineral resources*

◇ **wasteland** *noun* area of land which is no longer usable for agriculture, or for any other purpose; *overgrazing has produced wastelands in Central Africa*

◇ **wastewater** *noun* waste water from industrial processes; *there is considerable interest in the anaerobic treatment of industrial wastewaters*; *wastewater will add small but significant quantities of heavy metals to the aquatic environment*

water 1 *noun* common liquid (H₂O) which forms rain, rivers, the sea, etc. and which makes up a large part of the bodies of organisms; **heavy water** = deuterium oxide, a type of water containing deuterium instead of the hydrogen atom, used in some types of power station as a moderator; **light water** =

ordinary water used as a coolant in some types of power station; **water balance** = (i) state where the water lost in an area by evaporation or by runoff is replaced by water received in the form of rain; (ii) state where the water lost by the body (in urine or perspiration, etc.) is balanced by water absorbed from food and drink; **water-salt balance** = state where the water in the soil balances the amount of salts in the soil; **water closet** = toilet where the excreta are washed away by running water into the sewerage system; **water meadow** = grassy field near a river, which is subject to flooding; **water pollution** = pollution of water 2 *verb* to pour water onto (a plant)

COMMENT: water is essential to plant and animal life. Since the human body is formed of more than 50% water, a normal adult needs to drink about 2.5 litres (5 pints) of fluid each day. Water pollution can take many forms: the most common are discharges from industrial processes, household sewage and the runoff of chemicals used in agriculture

waterborne *adjective* (disease) carried in water; *after the floods diarrhoea, dysentery and other waterborne diseases spread rapidly*

◇ **watercourse** *noun* a stream or river

◇ **waterfowl** *noun* birds which live on water (such as ducks)

◇ **waterhole** *noun* (i) place in a desert where water rises naturally to the surface; (ii) similar place, created by boring holes in the ground; *in the evening, the animals gather round the waterholes to drink*

◇ **waterlogged** *adjective* (soil) which is saturated with water, and so cannot keep oxygen between its particles (hence most plants cannot grow in waterlogged soil)

◇ **waterproof** *adjective* which will not let water through

◇ **watershed** *noun* line between the headstreams of river systems, dividing one catchment area from another

waterspout *noun* phenomenon caused when a rapidly turning column of air forms over water, sucking the water up into the column

COMMENT: waterspouts form in summer weather as air rises rapidly from the warm surface of the sea. Waterspouts turn cyclonically (i.e. anticlockwise in the Northern Hemisphere). When the waterspout moves onto dry land, it loses momentum and falls as salt-water rain. The rain sometimes contains fish which have been sucked up into the spout

water table *noun* top level of water in the ground that occupies spaces in rock or soil and is above a layer of impermeable rock

◇ **waterway** *noun* river or canal used as channel for moving around

◇ **waterwheel** *noun* wheel with wooden steps or buckets, which is turned by the flow of water against it, and itself turns machinery, such as a mill or an electric generator; *see also* OVERSHOT, UNDERSHOT

◇ **waterworks** *noun* plant for treating and purifying water before it is pumped into the water pipes

wave *noun* (a) pressure change or signal that rises and falls as it travels through a medium; **sound wave** = audible change of pressure which moves through the air (b) mass of water moving across the surface of a body of water, rising higher than the surrounding water as it moves; **wave power** or **wave energy** = electrical energy produced by using the movement of waves

◇ **wavelength** *noun* distance between two similar points in adjacent waves

COMMENT: in harnessing wave power, the movement of waves on the surface of the sea is used to make large floats move up and down. These acts as pumps which pump a continuous flow of water to turn a turbine

waymarking *noun* indicating the direction of a public path by special signs

QUOTE the Trust has improved and waymarked 24 kilometres of footpath
Environment Now

weather 1 *noun* daily atmospheric conditions (e.g. sunshine, wind, precipitation) in a certain area, as opposed to climate which is the average weather for the area; **weather chart** or **weather map** = map which shows the weather in a certain area at a certain time; **weather forecast** = description of what the weather will be like for a period in the future; **weather forecasting** = scientific study of weather which allows forecasts of the weather to be made; **weather ship** = ship which takes readings of weather conditions and relays them back to a central station; **weather station** = place where weather is recorded 2 *verb* to wear down (rock) under the influence of frost or wind or rain, etc.

◇ **weathering** *noun* changing the state of soil or rock through the influence of the climate (rainfall, hot sun, frost, etc.) or by chemical pollutants present in the rain or the atmosphere

web *noun* threads secreted by a spider in the form of a net; **food web** = series of food chains which are linked together in the same ecosystem

◇ **webbed** *adjective* with skin between the toes; *ducks and other aquatic birds have webbed feet*

weed *noun* wild plant which grows in cultivated land, and which the farmer or gardener tries to remove

◇ **weedkiller** *noun* substance used to kill weeds; **selective weedkiller** = substance which is meant to kill only certain types of weed

COMMENT although weedkillers are widely used in farming and horticulture, they can have serious side-effects. They may blow away from the area where they are being sprayed; excess weedkiller enters the soil and is leached away by rain into watercourses, killing water plants

well *noun* hole dug in the ground to the level of the water table, from which water can be extracted either by a pump or by a bucket; **artesian well** = well bored into a confined aquifer

◇ **wellhead** *noun* top of a well

Wentworth-Udden scale *noun* scale for measuring and describing the size of grains of minerals

COMMENT: the scale runs from the largest size, the boulder, down to the finest grain, or clay. The approximate diameters of each grain are: boulder (up to 256mm); cobble (above 64mm); pebble (between 4 and 64mm); gravel (between 2 and 4mm); sand (.06 - 2mm); silt and clay are the finest sizes

west *noun & adjective* direction towards the setting sun; **west wind** = wind blowing from the west

◇ **westerly 1** *adjective* (i) to the west; (ii) from the west; *the ship was proceeding in a westerly direction*; *a westerly airstream covers the country* **2** *noun* wind which blows from the west

◇ **western** *adjective* referring to the west

wet *adjective* not dry or covered in liquid; **wet bulb hygrometer** = thermometer where the bulb is kept wet, used with a dry bulb thermometer to give a humidity reading

◇ **wetlands** *noun* area of land which is often covered by water or which is very marshy; *there are two important wetland sites in the area*

whale *noun* one of various types of very large mammals living in the sea

◇ **whaler or whaling boat** *noun* ship which is specially equipped for catching whales

◇ **whaling** *noun* catching whales to use as food or for their oil, etc.; **whaling fleet** = fleet of boats which set out to catch whales

COMMENT: whales are the largest mammals still in existence. There are two groups of whales: the toothed and the baleen whales. Baleen whales have no teeth, and feed by sucking in large quantities of water which they then force out again through their baleen, which is a series of fine plates like a comb hanging down from the upper jaw. The baleen acts like a sieve and traps any plankton and krill which was in the water. The toothed whales have teeth and eat fish; they include the sperm whale, the killer whale and porpoises and dolphins. Whales are caught mainly for their oils, though also in some cases for food. Some species of whales have become extinct because of overexploitation, and the population of many of the existing species is dangerously low. Commercial whaling is severely restricted

wheat *noun* common cereal, grown in the temperate regions

◇ **wheatgerm** *noun* central part of the wheat seed, which contains valuable nutrients

whirlpool *noun* rapidly turning eddy of water

◇ **whirlwind** *noun* column of rapidly turning air, which forms in hot weather (over water it becomes a waterspout, and over desert a dust devil)

wholefood *noun* naturally or organically grown food, which has not been processed; *a wholefood diet is healthier than eating processed foods*

◇ **wholegrain** *noun* food (such as rice) of which the whole of the seed is eaten

◇ **wholemeal bread** *noun* bread made from flour which has had nothing removed or added to it and contains a large proportion of the original wheat seed, including the bran

wild *adjective* not domesticated; **wild rice** = species of grass which is found naturally in North America and which is similar to rice

◇ **wildlife** *noun* wild animals and birds; *plantations of conifers are poorer for wildlife than mixed or deciduous woodlands*; *the effects of the open-cast mining scheme would be disastrous on wildlife, particularly on moorland birds*

wilderness *noun* area of wild uncultivated land, usually far from habitation, but sometimes referring to wild land in an urban area

QUOTE the recent successes of Berlin's conservationists in preserving some of the city's valuable wilderness areas have shown that it may be possible to maintain a park-like environment despite the pressures of urban growth

Environment

willow *noun* strong temperate hardwood, often used for coppicing or pollarding

wind *noun* air which moves in the lower atmosphere; *the weather station has instruments to measure the speed of the wind*; **wind-driven** or **wind-powered** = (machine or turbine) that is powered by the wind; **wind erosion** = erosion of soil or rock by wind; **wind farm** or **wind park** = group of large windmills, built to harness the wind to produce electricity; **wind pollination** = pollination of flowers when the pollen is blown by the wind; **wind power** = power generated by using wind to drive a machine (as in a windmill) or to drive a turbine which creates electricity; **wind pump** = small pump driven by the wind, used to pump water from wells; **wind rose** = chart showing the direction of the prevalent winds in an area

◇ **wind chill factor** *noun* way of calculating the risk of exposure in cold weather by adding the speed of the wind to the number of degrees of temperature below zero

QUOTE with wind farms popping up all over the world, wind power's future looks bright. The only problem could be environmental impact - locating hundreds of machines in windy areas can lead to conflict. Even though wind turbines do not generate waste or pollutants, care must be taken to avoid noise pollution

Environment Now

QUOTE a proposal to site one of Britain's first wind parks on an exposed area of high fell has angered the government's advisers on environmental protection

New Scientist

windmill *noun* construction with sails which are turned by the wind, so driving a machine; see also PANEMONE

COMMENT: windmills were originally built to grind corn or to pump water from marshes. Large modern windmills are used to harness the wind to produce electricity

windward *adjective* exposed to the wind; *the trees provide shelter on the windward side of the house*

winter 1 *noun* the cold season of the year, when the days are short, when plants do not flower or produce new shoots, and when some animals hibernate; **winter solstice** = 21st December, the shortest day in the Northern Hemisphere, when the sun is furthest north of the equator; **nuclear winter** = period which scientists believe will follow after a nuclear war, when there would be no warmth and light because dust particles would obscure the sun and most life would be affected by radiation 2 *verb* to spend the winter in a place

QUOTE the birds wintered in the tall grass prairies of Southern Louisiana

Birder's World

wood *noun* (a) (i) hard tissue which forms the main body of a tree; (ii) construction material that comes from trees; **wood alcohol** = methanol, alcohol manufactured from waste wood, which can be used as fuel; see also **HARDWOOD**, **SOFTWOOD** (b) large number of trees growing together

◇ **-wood** or **-woods** *suffix* referring to wood; **beechwoods** = forests of beech trees; **fuelwood** = wood grown for use as fuel; **pulpwood** = softwood grown for making paper

◇ **woodfuel** *noun* wood which is used as fuel

◇ **woodlands** or **woods** *noun* land covered with trees with clear spaces between them (i.e. not as dense as a forest); **ancient woodland** = wooded area which has been covered with trees for many hundreds of years

◇ **woodlot** *noun* small area of land planted with trees

◇ **woodpulp** *noun* material produced by pulverizing softwood into tiny fragments and mixing it with water. This is used for making paper

QUOTE three-quarters of our breeding land birds, half of our butterflies and one sixth of our flowers need woodland habitats

Sunday Times

woodstove or **wood-burning stove** *noun* heating device which burns wood

COMMENT: although woodstoves are apparently contributing to a better environment by not burning fossil fuels, by using renewable resources and by not releasing dangerous pollutants into the atmosphere, they do in fact burn vast quantities of wood, and can contribute to deforestation unless the wood is coppiced

work *noun* energy used when something is forced to move

◇ **work out** *verb* to use up something completely; *the coal mine was worked out years ago*

◇ **worker** *noun* sterile bee which forages for food

◇ **workings** *noun* underground tunnels in a mine

worm *noun* earthworm, any of several species of invertebrate animals with a long thin shape

COMMENT: worms provide a useful service in aerating the soil. It is also believed that they encourage root development in plants by a substance which they secrete

Xx Yy Zz

X chromosome *noun* sex chromosome

COMMENT: every person has a series of pairs of chromosomes, one of which is always an X chromosome; a normal female has one pair of XX chromosomes, while a male has one XY pair. Haemophilia is a disorder linked to the X chromosome

Xe *chemical symbol* for xenon

xeno- *prefix* meaning different

◇ **xenobiotics** *noun* chemical compounds that are foreign to an organism

xenon *noun* noble gas, traces of which are found in the atmosphere

NOTE: chemical symbol is **Xe**; atomic number is 54

xero- *prefix* meaning dry

◇ **xeromorphic** *adjective* (plant) which can prevent water loss from its stems during hot weather

◇ **xerophilous** *adjective* (plant) which lives in very dry conditions

◇ **xerophyte** *noun* plant which is adapted to living in very dry conditions

◇ **xerosere** *noun* succession of communities growing in dry conditions

X-ray 1 *noun* (a) ray with a very short wavelength, which is invisible, can go through soft tissue and register on a photographic plate (b) photograph taken using X-rays 2 *verb* to take an X-ray photograph

COMMENT: because X-rays go through soft tissue, it is sometimes necessary to make internal organs opaque so that they will show up on the film. In the case of stomach X-rays, patients take a barium meal before being photographed (contrast radiography); in other cases, such as kidney X-rays, radioactive substances are injected into the bloodstream or into the organ itself. X-rays are used not only in radiography for diagnosis but as a treatment in radiotherapy. Exposure to X-rays, either as a patient being treated, or as a radiographer, can cause radiation sickness

xylem *noun* wood or solid tissue in plants

yaws *plural noun* tropical disease caused by the spirochaete *Treponema pertenue*

COMMENT: symptoms include fever with raspberry-like swellings on the skin, followed in later stages by bone deformation

Y chromosome *noun* male chromosome

COMMENT: the Y chromosome has male characteristics and does not form part of the female genetic structure. A normal male has an XY pair of chromosomes. See also the note at X CHROMOSOME

yeast *noun* fungus which is used in the fermentation of alcohol and in making bread

COMMENT: yeast is a good source of Vitamin B, and can be taken in dried form in tablets

yellowing *noun* condition where the leaves of plants turn yellow, caused by lack of light; **lethal yellowing (LY)** = disease which attacks and kills coconut palms

yield 1 *noun* quantity of a product produced from a plant or from an area of land; *the normal yield is 2 tonnes per hectare; the green revolution increased rice yields in parts of Asia 2 verb* to produce a crop or a product; *the rice can yield up to 2 tonnes per hectare; the oil deposits may yield 100,000 barrels a month*

QUOTE research has shown what must have been known to stockmen for years, that kindness to cows increases their milk yield, yet the pharmaceutical industry is determined to increase milk production by injecting cows with the hormone bovine somatotropin (BST)

Ecologist

yolk *noun* yellow central part of an egg; **yolk sac** = membrane which encloses the yolk in embryo fish, reptiles and birds

zero population growth *noun* state when a population's birth rate and death rate are equal so that the size of the population remains the same

zinc *noun* white metallic trace element, essential to biological life, used in alloys and as a protective coating for steel NOTE: chemical symbol is **Zn**; atomic number is **30**

zone *noun* area of land

◇ **zonal** *adjective* referring to a zone; **zonal air stream** = stream of air blowing from west to east in the upper atmosphere of the Northern Hemisphere

◇ **zoning** *noun* order by a government or local council that an area of land shall be used only for one type of building

zoo- *prefix* meaning animals

◇ **zoogeographical** *adjective* referring to animals and geography; **zoogeographical region** = large area of the world where the fauna is different from that in other areas; *see also* BIOGEOGRAPHICAL REGION

◇ **zoophyte** *noun* animal which looks like a plant

◇ **zooplankton** *noun* microscopic living animals which drift or float in water; *some zooplankton eat algae*

NOTE: the word is plural

zygote *noun* fertilized ovum, the first stage of development of an embryo

SUPPLEMENT

OUTLINE CLASSIFICATION OF LIVING ORGANISMS

Recent classifications include five kingdoms:

Kingdom Monera: typically single-cell organisms without (unlike the other kingdoms) a membrane surrounding the cell nucleus.

Kingdom Protista: single-cell organisms, and single-cell organisms living in colonies.

Kingdom Fungi: multicell organisms which absorb nutrients and have many nuclei per cell.

Kingdom Plantae: multicell organisms which photosynthesize food with photosynthetic pigments.

Kingdom Animalia: multicell organisms which ingest food and have no photosynthetic pigments. Estimates of the number of species differ from one authority to another depending on how the species are classified. Estimates are likely to change because so many species have not yet been discovered or catalogued. This is particularly true of phylum Arthropoda, which contains more species than the total of all other animal species and may number in the millions. Most of these live in tropical rainforests and will disappear without being discovered as the forests are cut down.

<i>phylum</i>	<i>representative common name</i>	<i>estimated number of known species</i>
KINGDOM MONERA		
Cyanophyta	blue-green algae	2,500
Myxobacteriae	gliding bacteria	-
Schizophyta	true bacteria	3,000
Actinomycota	branching bacteria	-
Spirochaetae	spirochetes	-
KINGDOM PROTISTA		
Euglenophyta	euglenoids	450
Xanthophyta	yellow-green algae	400
Chrysophyta	golden-brown algae	10,000
Pyrrophyta	dinoflagellates	1,100
Hyphochytridiomycota	hyphochytrids	-
Plasmodiophoromycota	plasmodiophores	-
Sporozoa	sporozoans	-
Cnidosporidia	cnidosporidians	-
Zoomastigina	animal flagellates	-
Sarcodina	rhizopods	-
Ciliophora	ciliates	-
KINGDOM FUNGI		
Myxomycota	slime moulds	450
Acrasiomycota	slime moulds	25
Labyrinthulomycota	slime moulds	15

Oomycota	water moulds	200
Chytridomycota	chytrids	-
Zygomycota	black moulds	300
Ascomycota	sac fungi	30,000
Basidiomycota	mushrooms	15,000

KINGDOM PLANTAE

<i>division</i>	<i>common name</i>	<i>estimated number of known species</i>
Rhodophyta	red algae	4,000
Phaeophyta	brown algae	1,500
Chlorophyta	green algae	10,000
Charophyta	stoneworts	-
Bryophyta	mosses	25,000
Lycopodiophyta	clubmosses	900
Equisetophyta	horsetails	-
Polypodiophyta	ferns	9,000
Pinophyta	conifers	640
Magnoliophyta	flowering plants	250,000

KINGDOM ANIMALIA

<i>phylum</i>	<i>common name</i>	<i>estimated number of known species</i>
Mesozoa	mesozoans	-
Porifera	sponges	4,000
Cnidaria	jellyfish	10,000
Ctenophora	comb jellies	100
Platyhelminthes	flatworms	14,000
Nemertea	proboscis worms	550
Nematoda	roundworms	8,000
Acanthocephala	hook-headed worms	100
Nematomorpha	horsehair worms	200
Rotifera	rotifers	1,200
Gastrotricha	gastrotrichs	100
Entoprocta	bryozoa	60
Ectoprocta	colonial bryozoa	5,000
Brachiopoda	lamp shells	200
Phoronida	phoronids	10
Annelida	worms	10,000
Onychophora	onychophors	5
Arthropoda	insects	800,000
Mollusca	snails	80,000
Brachiata	beard worms	-
Chaetognatha	arrow worms	30
Echinodermata	starfish	6,000
Hemichordata	acorn worms	100
Chordata	vertebrates	70,000

GEOLOGICAL TIME SCALE AND RADIATION OF SOME FLORA AND FAUNA

<i>era</i>	<i>period</i>	<i>epoch</i>	<i>millions of years ago</i>	<i>radiation of some flora & fauna</i>	
Cenozoic	Quaternary	Holocene	0.01	<i>Homo</i> (man)	
		Pleistocene	2		
	Tertiary	Pliocene	5		
		Miocene	23		
		Oligocene	37		
		Eocene	55		
		Palaeocene	65		
Mezozoic	Cretaceous		136	flowering plants	
	Jurassic		190	birds	
	Triassic		225	mammals	
Palaeozoic	Permian		280	reptiles	
	Carboniferous		345		
	Devonian		395		
					conifers and amphibians
	Silurian		440	land plants	
	Ordovician		500	fish	
	Cambrian		570		
Precambrian (<i>comprising 87% of geological time</i>)			3300	invertebrates first known fossils	
			4600	origin of the earth	

ESTIMATED HUMAN POPULATION GROWTH SINCE 8000 B.C.

<i>year</i>	<i>millions</i>
8000BC	6
1AD	255
1000	255
1250	400
1500	460
1600	600
1700	680
1800	950
1900	1600
1920	1860
1930	2070
1940	2295
1950	2500
1960	3050
1970	3700
1980	4400
1985	4800
1987	5000
<i>projected</i>	
2000	6000
2025	8200
2090	10500

The human population increased extremely slowly for the first 200,000 years of its existence. It began to accelerate with the arrival of agriculture, about 10,000 years ago. It reached one billion by about 1800, two billion by about 1930, three billion by about 1960, four billion by about 1970 and five billion by about 1987. At present the world population is expanding by about 80 million a year and is expected to double in size within the next hundred years. An ideal population size is one that can be sustained indefinitely without harming its environment.

Periodic Table of the Elements

Periodic Table of the Elements																	
IA	IIA	IIIB	IVB	VB	VIB	VIIIB	IB	IIB	IIIA	IVA	VA	VIA	VIIA	O			
1 H														2 He			
3 Li	4 Be								5 B	6 C	7 N	8 O	9 F	10 Ne			
11 Na	12 Mg								13 Al	14 Si	15 P	16 S	17 Cl	18 Ar			
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	57* La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	89† Ac															

← Transition metals →

*Lanthanides	57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
†Actinides	89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

SI UNITS AND ABBREVIATIONS

A	ampere	unit of electrical current
C	coulomb	unit of electrical charge (As)
cd	candela	unit of light intensity
F	farad	unit of capacitance (C/V)
H	henry	unit of inductance (Vs/A)
Hz	hertz	unit of frequency (cycles per second)
J	joule	unit of energy (kg m/s)
K	kelvin	unit of temperature
kg	kilogram	unit of mass
lm	lumen	unit of illumination (cd/sr)
lx	lux	unit of illumination density (lm/m ²)
m	metre	unit of length
mol	mole	unit of amount of substance
N	newton	unit of force (J/m)
Pa	pascal	unit of pressure
rad	radian	unit of plane angle
s	second	unit of time
sr	steradian	unit of solid angle
S	siemens	unit of electrical conductance (1/ohm)
T	tesla	unit of magnetic flux density (WB/m)
V	volt	unit of electrical potential (W/A)
W	watt	unit of power (J/s)
Wb	weber	unit of magnetic flux (Vs)
Ω	ohm	unit of electrical resistance (V/A)
C	degree Celsius	unit of temperature (K+273)

SI PREFIXES

Decimal multiples and submultiples to be used with SI units

<i>prefix</i>	<i>symbol</i>	<i>factor</i>	<i>prefix</i>	<i>symbol</i>	<i>factor</i>
tera-	T	10^{12}	centi-	c	10^{-2}
giga-	G	10^9	milli-	m	10^{-3}
mega-	M	10^6	micro-	μ	10^{-6}
kilo-	k	10^3	nano-	n	10^{-9}
hecto-	h	10^2	pico-	p	10^{-12}
deka-	da	10^1	femto-	f	10^{-15}
deci-	d	10^{-1}	atto-	a	10^{-18}

VITAMINS

Vitamins are substances which are required in tiny amounts in food. They promote the normal health and metabolism of the body, and can normally be obtained in a diet of natural foods. Although they are complex chemical substances, the structure and composition of most of them are known, most have been isolated, and some have been synthesized. As they are concerned with metabolism, it follows that absence or deficiency of certain vitamins can result in malnutrition and specific deficiency diseases. Almost all must be obtained preformed from external sources, the exceptions being vitamin A which is formed from its precursor carotene, vitamin D which is formed by the action of ultraviolet light on the skin, and vitamin K which is formed by the action of intestinal bacteria.

The following is a summary of the characteristics, actions, and sources of vitamins:

Vitamin A

This keeps mucous membranes healthy, is necessary for normal growth, formation of skin, glands and bone, and for properly functioning eyesight.

Sources. Liver, butter, margarine, milk, eggs, yellow and orange fruits, green vegetables, cod liver oil and halibut liver oil.

Characteristics. Fat soluble; not destroyed by normal cooking temperatures; is stored in the liver.

Recommended daily intake. Adults: 5000 IU (pregnancy: 6000 IU; lactation: 8000 IU); children: 2000–5000 IU; infants: 1500 IU.

Results of deficiency. Reduced resistance to infection; interference with normal growth; imperfect calcium metabolism and formation of bone, teeth, and cartilage; imbalance of the intestinal flora; night blindness.

Vitamin B complex

This is a large number of related vitamins: B₁ (thiamine); B₂ (riboflavine); niacin (nicotinic acid); B₆ (pyridoxine); biotin; pantothenic acid; B₁₂ (cyanocobalamin); and folic acid. Many other factors are present in the B complex.

Sources. Thiamine (B₁): wheat germ, bread, pork, potatoes, liver, milk; Riboflavin (B₂): liver, eggs, milk; Nicotinic acid (niacin): yeast, liver, bread, wheat germ, milk, kidney; Pyridoxine (B₆): meat, fish, milk, yeast; Biotin: liver, yeast, milk, butter; Pantothenic acid: liver, yeast, eggs, and many other foods; Cyanocobalamin (B₁₂): liver, kidney, eggs, fish; Folic acid (also called vitamin B₉): green vegetables, liver, mushrooms, yeast.

Characteristics. Water soluble; not destroyed by normal cooking temperatures, but overcooking (and an alkaline environment) can damage them; B₁ can be stored by the body only in a limited way; B₂ is not stable to light.

Recommended daily intake. Thiamine: Adults: 1.0–1.6 mg (pregnancy: 1.3 mg; lactation: 1.7 mg); children: 0.7–1.8 mg; infants: 0.4–0.5 mg. Riboflavin: Adults: 1.4–2.5 mg (pregnancy: 2.0 mg; lactation: 2.5 mg); children: 1.0–2.0 mg; infants: 0.4–0.9 mg. Niacin: Adults: 17–21 mg (pregnancy: 15 mg; lactation: 15 mg); children: 8–21 mg; infants: 6–7 mg.

Results of deficiency. Generally, B complex vitamin deficiency results in loss of appetite, impaired digestion of starches, constipation and diarrhoea; severe deficiency results in various nervous disorders, loss of co-ordinating power of muscles, and beriberi. More specifically, B₂ deficiency results in cheilosis, weakness, and impaired growth; niacin deficiency results in pellagra, gastrointestinal disturbances, and mental disturbance. Cyanocobalamin deficiency results in anaemia (cyanocobalamin is used in the treatment of pernicious anaemia, sprue, nutritional anaemia, and macrocytic anaemias of infancy and pregnancy).

Vitamin C (Ascorbic acid)

This increases resistance to infection and keeps the skin in a healthy condition. It improves the circulation and the condition of the gums and other body tissues, and promotes healing of wounds.

Sources. Citrus fruits, rose-hip syrup, blackcurrants, fresh vegetables, tomatoes.

Characteristics. Water soluble; easily destroyed by overcooking; storage reduces efficacy unless canned or frozen; stored in the body only to a limited extent.

Recommended daily intake. Adults: 70 mg (pregnancy: 100 mg; lactation: 150 mg); children: 35–100 mg; infants: 30 mg.

Results of deficiency. Lowered vitality; joint tenderness; dental caries; lowered resistance to infection; fibrous tissue abnormalities. Severe deficiency results in haemorrhage, anaemia, and scurvy.

Vitamin D

This vitamin is essential for the proper utilization of calcium and phosphorus, and thus directly influences the structure of bones and teeth. It affects the blood chemistry.

Sources. Butter, egg yolk, fish liver oils and oily fish, yeast. As mentioned, the vitamin can be synthesized by the skin under the stimulus of sunlight or ultraviolet light.

Characteristics. Fat soluble; can be stored in the liver.

Recommended daily intake. The adult can generally synthesize sufficient of this vitamin, but deficiencies have occurred in dark-skinned individuals or elderly people who live in temperate areas where the sunlight they receive is insufficient. In pregnancy: 400 IU; lactation: 400 IU; children: 400 IU; infants: 400 IU.

Results of deficiency. Interference with calcium and phosphorous metabolism; weakness and irritability. Severe deficiency results in rickets in children and osteomalacia in adults.

Vitamin E

Little is known about the physiological activity of this vitamin, but animal experiments suggest that it is concerned with the reproductive cycle and fertility; it may also have an effect on the ageing process. It is present in most foods, particularly in green vegetables.

Vitamin K

This is responsible for the biosynthesis of prothrombin and for maintaining plasma prothrombin levels.

Sources. Green leafy vegetables, liver.

Characteristics. Fat soluble; not destroyed by cooking.

Recommended daily intake. Not known, but children should receive 1 microgram.

ENDANGERED SPECIES

The following species are all categorized by the International Union for Conservation of Nature and Natural Resources as either 'endangered' or 'vulnerable'. When available, information about numbers is given but for obvious reasons this is not always possible. A fuller list (of over 4,000 species) can be found in the 1988 IUCN Red List of Threatened Animals and more details in the various IUCN Data Books.

MAMMALS

Black rhinoceros (*Diceros bicornis*). Sub-Saharan Africa. Fewer than 3,000 remain.

[The **great one-horned rhino** (*Rhinoceros unicornis*) survives in protected areas of northeast India and Nepal, where it numbers about 1,500. The smaller **Javan one-horned rhino** (*Rhinoceros sondaicus*) numbers about 50, found only in Ujung Kulon sanctuary in western Java. Only a few hundred of **Sumatran rhino** (*Dicerorhinus sumatrensis*) survive in forested hills of Sumatra and Malaysia.]

Greater Bamboo Lemur (*Hapalemur simus*). Madagascar. 8-15 known to survive at Kianjavato.

Black Lion Tamarin [monkey] (*Leontopithecus chrysopygus*). Brazil. 75-100 surviving.

Pygmy hippopotamus (*Choeropsis liberiensis*). West Africa.

Woolly Spider Monkey (*Brachyteles arachnoides*). Brazil. Only a few hundred survive.

Mountain Gorilla (*Gorilla gorilla beringei*). Rwanda, Uganda, Zaire. About 400 surviving.

Indus River Dolphin (*Plantanista minor*). Pakistan.

Blue Whale (*Balaenoptera musculus*). All Oceans. 5-10,000 surviving.

Giant Panda (*Ailuropoda melanoleuca*). China. About 1,000 surviving.

Tiger (*Panthera tigris*). Asia. 3,500-5,000 surviving.

BIRDS

Madagascar Serpent Eagle (*Eutriochis astur*). Madagascar. Not seen for over 50 years, but it is hoped it survives in primary forest in central-east and north-east Madagascar.

Ivory-billed Woodpecker (*Campephilus principalis*). Cuba. Presumed extinct in mainland USA, it was sighted in 1986 in Cuba.

Gurney's Pitta (*Pitta gurneyi*). Thailand. Not seen for 34 years then a nesting pair found in June 1986.

Highland Guan (*Penelopina nigra*). Central America. Widespread deforestation depriving them of habitat.

Salmon-crested cockatoo (*Cacatua moluccensis*). Indonesia.

Spanish Imperial Eagle (*Aquila adalberti*). Portugal, Spain.

Black Stilt (*Himantopus novaezeelandia*). New Zealand.

Resplendent Quetzal (*Pharomachrus mocinno*). Central America.

REPTILES AND AMPHIBIANS

Kemp's Ridley Turtle (*Caretta caretta*). Subtropical and temperate seas.

Galapagos Giant Tortoise (*Geochelone elephantopus*). Galapagos Island.

Nile Crocodile (*Crocodylus niloticus*). Africa, Madagascar.

Komodo Dragon (*Varanus komodoensis*). Indonesia.

Round Island Boa (*Casarea dussumieri*). Round Island, Mascarene Islands. About 75 survive.

Giant Garter Snake (*Thamnophis gigas*). USA.

Golden Toad (*Bufo periglenes*). Costa Rica.

Gold-striped Salamander (*Chioglossa lusitanica*). Portugal, Spain.

FISH

Valencia Toothcarp (*Valencia hispanica*). Spain. Only known to survive near Valencia and possibly Seville.

Common Sturgeon (*Acipenser sturio*). Europe.

Giant Catfish (*Pangasianodon gigas*). Mekong Basin.

Freshwater Mullet (*Myxus capensis*). South Africa.

Tidewater Goby (*Eucyclogobius newberryi*). USA.

INVERTEBRATES OTHER THAN INSECTS

Far Northern Flax Snail (*Placostylus ambagiosus*). New Zealand. 200 survive.

Starlet Sea Anemone (*Nematostella vectensis*). UK, North America.

Black-lipped Pearl Oyster (*Pinctada margaritifera*). Indo-Pacific.

Medicinal Leech (*Hirudo medicinalis*). Europe.

Red-kneed Tarantula (*Brachypelma smithi*). Mexico.

Giant Freshwater Crayfish (*Astacopsis gouldi*). Tasmania.

INSECTS

Relict Himalayan Dragonfly (*Epiophlebia laidlawi*). Nepal/India.

Prairie Mole Cricket (*Gryllotalpa major*). USA.

Pygmy Hog Sucking Louse (*Haematopinus oliveri*). India.

Woolly Diving Beetle (*Hydroporus hirsutus*). USA.

Large Blue Butterfly (*Maculinea arion*). Europe, USSR.

Scarce Fritillary (*Hypodryas maturna*). Europe.

Yellow-faced Bee (*Nesoprosopis*). Hawaii.

PLANTS

Abies beshanzenensis. China. Only five specimens of this fir tree left on Baishanzen mountain in Zhejiang Province.

Dicliptera dodsonii. Ecuador. One plant of this vine survives.

Ramosmania heterophylla. Rodrigues, Mascarene Islands. One tree survives. (A cutting has rooted and been potted at the Royal Botanic Gardens, Kew, England).

Medemia argun. Egypt/Sudan. Three sites with survivors of this palm located in 1960s.

Chiapas Slipper Orchid (*Phragmipedium exstaminodium*). Mexico. Only one population known to survive, threatened by slash and burn cultivators and by collecting.

Green Pitcher Plant (*Sarracenia oreophila*). USA. Known only in a small area of northeastern Alabama and one site in northern Georgia.

Big-leaf Palm (*Marojejya darianii*). Madagascar. About 50 survive.

RECENT MAJOR NATURAL DISASTERS

In their book *Natural disasters: Acts of God or acts of Man?* Anders Wijkman and Lloyd Timberlake point out that there are over 3,000 deaths per disaster in low-income countries, compared with 500 in high-income countries. The major factors in disasters in the Third World are poverty, environmental degradation and rapid population growth.

July 1979–May 1981 Drought. *Hebei province, China.* Worst for sixty years. Much of area, normally one of the most fertile in China, became a virtual desert. 14,000,000 peasants left dependent on government grain rations. It was estimated 2,000,000 children were suffering from malnutrition.

10 October 1980 Earthquakes. *El Asnam, Algeria.* 7.5 and 6.5 on Richter scale. 3,600 dead. 8,252 injured. 300,000 homeless. The town had been destroyed in 1954 by another earthquake which killed 1,000. It was rebuilt by the French with supposedly 'quake-proof' structures. These were the worst affected by the 1980 quake.

late August–early September 1980 Hurricane David. *Dominican Republic.* 20 killed. 60,000 homeless. Banana and grapefruit crops destroyed.

18 May 1980 Volcanic eruption. *Mount St Helens, Washington state, USA.* 2,000 people evacuated. Large quantities of volcanic ash blanketed communities to a depth of several feet in parts of Washington, Idaho and Montana.

23 November 1980 Earthquake. *South Italy.* 6.8 on Richter scale. Aftershocks continued for 10 days. 200 towns and villages affected: Naples, Salerno, Avellino worst affected. 4,500 dead. 8,000 injured. 350,000 homeless.

9–14 July 1981 Floods. *Szechuan province, China.* 1,385 dead. 14,509 injured. Affected 10 million people in 135 of the province's 212 counties, threatened the Gezhouba dam and destroyed more than 1,000,000 acres of crops.

late 1982–1983 Floods. *Eastern Bolivia.* 40,500 hectares (100,000 acres) of prime agricultural land destroyed. At the same time in the high valleys of Bolivia and in southern Peru drought conditions devastated the potato crop affecting about 2 million people.

13 December 1982 Earthquake. *North Yemen, Dhamar region.* 6.0 on Richter scale. 1,588 killed. 1,604 injured. 200,000 homeless.

February 1983–July 1984 Drought. *Northeast Brazil: (Maranhão to northern part of Minas Gerais).*

Fifth year of drought. 850,000 sq kms affected. By mid-1982 70% of population suffering from malnutrition.

24–25 May 1985 Cyclone and tsunami. *S.E. Bangladesh.* 11,000 killed. 250,000 homeless.

13 November 1985 Volcanic eruption. *Armero, Colombia.* The Nevado del Ruiz volcano erupted leaving 25,000 dead, 4,000 injured and 20,000 homeless. The village of Armero was totally engulfed by a torrent of mud when La Lagunilla river burst its banks. 11,000 hectares of agricultural land ruined.

19 September 1985 Earthquake. *Mexico City, Mexico.* 8.1 on Richter scale. More than 7,000 dead. 30,000 injured. 10,000 seriously. 100,000 homeless.

21–22 August 1986 Toxic gases following volcanic eruption. *Lake Nyos, Cameroon.* Toxic gases (a mixture of carbon dioxide and hydrogen sulphide) were released from volcanic Lake Nyos, near the Nigerian border, killing 1,746 and injuring 3,000, though exact numbers of casualties will probably never be known. In Nyos village only 2 out of a population of 700 survived.

10 October 1986 Earthquake. *San Salvador, El Salvador.* 7.5 on Richter scale. 1,500 killed. 300,000 homeless. On the outskirts of the city a landslide buried 100 people.

5–6 March 1987 Earthquake. *Ecuador.* 7.3 on Richter scale. Followed by 1,300 aftershocks. 2–4,000 killed. 50,000 homeless. Mudslides entombed whole villages.

August-September 1987 Floods. *Bangladesh*. 70 killed (a very low estimate). 24,000,000 homeless and without food (out of a total population of 100,000,000). 2,000,000 homes and 2,600 kms of road destroyed. 4,300,000 acres of land devastated.

27 September 1987 Heavy rains and mudslides. *Medellin, Colombia*. Shanty town of Villa Tina was buried by mud. 355 people dead. 200 seriously injured. 2,100 homeless.

February 1988 Mudslides. *Rio de Janeiro, Brazil*. In a shanty town in Rio after weeks of torrential rain. 300 killed. 735 seriously injured. 11,000 homeless.

August-September 1988 Floods. *Bangladesh*. Widespread flooding on a similar scale to the floods of 1987.

9-19 September 1988 Hurricane Gilbert. *Jamaica*. Over 200 mph winds. Left a trail of destruction across Jamaica, Grand Cayman, the Yucatan peninsula, Mexico, Texas. At least 240 killed, most of those in Yucatan.

RECENT MAJOR MAN-MADE DISASTERS

10 July 1976 *Seveso, Italy.* Release of dioxin (TCDD—tetrachlorodibenzo-p-dioxin) poisonous gas from factory producing trichlorophenol. Within a few days 80,000 domestic fowl and half the pig population had died. A sharp rise in percentage of deformed births.

March 1978 *off coast of Brittany, France.* Oil tanker Amoco Cadiz, runs aground. 220,000 tons of oil spilt. Over 1 million sea birds killed as well as other marine life.

1978 *Love Canal, near Niagara Falls, USA.* This abandoned canal became a dumping ground for chemical wastes (including polychlorinated biphenyls, dioxin and pesticides) produced in the 1940s and 1950s. The site was filled in and given to the city of Niagara Falls. Housing was built on it. In 1978 leakage of toxic chemicals began to be detected in the basements of houses. A very high incidence of chromosomal damage was found amongst residents. The areas was completely evacuated. It is not known what the long-term effects will be.

28 March 1979 Nuclear meltdown at *Three Mile Island, Pennsylvania, USA.* Mechanical and electrical failures were compounded by errors made by operators at the plant. It is not known how many deaths may have resulted.

June 1979 *Gulf of Mexico.* Oil rig out of control. Oil slick 640 miles long, with over 500,000 tons of oil spilt.

July 1979 *off coast of Tobago, West Indies.* Two supertankers, Atlantic Express and Aegean Captain, collide, 236,000 tons of oil spilt. Countless birds and marine life killed.

2 December 1984 *Bhopal, India.* Gas leak from pesticide plant. At least 2,000 killed and 250,000 treated for various ailments.

26 April 1986 *Chernobyl, USSR.* Roof of nuclear power station blown off, a hydrogen explosion then showered radioactive debris 1,500 metres into the air. Operational errors blamed. All Eastern Bloc countries, much of Scandinavia, all of Western Europe except Spain and Portugal are known to have been affected in varying degrees. At least 30 people at Chernobyl died almost immediately from burns or acute radiation sickness. The number of people finally affected will never be known.

1 November 1986 *River Rhine.* Following a fire at a chemical plant over 30 tons of pesticides, fungicides and other chemicals were washed into the river by firemen dousing the flames. Mercury was the main chemical involved. For almost two days none of the governments along the Rhine knew the true nature of the chemicals flowing down Europe's largest waterway. 200 miles of Upper Rhine practically dead and it is estimated that it will take 10–30 years to restore it to life.

Although these disasters seem (and indeed are) catastrophic, more pollution and human mortality occurs on a smaller but cumulatively greater scale each year. For instance, spills from oil tanker disasters are less than the cumulative total of small leaks, discharges and minor spills which occur throughout the year from such sources as tankers washing their empty holds with sea water, oil washed from cars and lorries into sewers, and pollution caused by routine handling of oil in refineries and garages. Sudden large-scale disasters do make an instant impact on us, and bring to our attention the way in which we are increasingly putting ourselves and our environment at risk.

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